

Thomas A Edison Papers

A SELECTIVE MICROFILM EDITION

*PART IV
(1899-1910)*

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**William H. Meadowcroft Papers
Reminiscences by Edison
G. Mr. Edison's Notes**

This document is a photocopy of an Edison notebook from October 1908. It contains a narrative of incidents from his boyhood, young adulthood, and years in Menlo Park. The notes are all in Edison's hand. A label on the front cover bears the following typewritten notation: "Book No. 2, Mr. Edison's notes re. Biography. October, 1908." The pages are unnumbered. Approximately 60 pages have been used. The original manuscript is at the Edison Winter Home in Fort Myers, Florida. The archives of the Edison National Historic Site holds a typescript prepared by Meadowcroft from Edison's notes.

BOOK NO. 2,
MR. EDISON' notes re.
Biography
October, 1908.

On black Friday — we had even
existing bids with the indicators the
Gold & Fish crowd had cornered gold
and it had run the quotations up faster
than the indicator would follow.
The Indicator was composed of
several wheels on the circumference
of each wheel were the numerals
of one wheel had 100 numbers it worked
the same as an ordinary counter
one wheel made 10 Revolutions
& at the 10th it advanced the
adjacent wheel 1 & this
wheel turn having gone 10
Revolutions advanced the next
wheel 1 & so on, on the morning
of Black Friday the Indicator
was quoting 150 premium when
the bid by Goulds agents in the
gold room was 165 for 5 million
for any part. We had a gas
wreath for the transmitter. At
1 o'clock reached the
right quotation, the excited

was prodigious New St as well
as Broad who jammed with
excited people. I sat up on the
top of the WU Tel booth to watch
the singing Crazy Crowd, one man
came to booth, grabbed a pencil &
attempted to write a message to
Plover. The 1st stroke went clear
off the blank, he was so excited
that he had the ops write the
message for him amidst great
excitement. Plover the banker went
Crazy as it took five men to
hold him & everybody lost they heard
the WU ops came to me & said
Shake Edison we are OK we havnt
got a Cent. I felt very happy because
joes were poor. These occasions
are very enjoyable to a poor man
but they occur rarely.

A friend of mine was an ops who
worked in the back office of
C. M. Belden & Co 60 Park Row, room
which were head quarters for Fish &
Mr Gould was up town in the Erie
office in the grand opera house

I could not make out but I heard messages that opened my eyes to the ramifications of all of gold fill to 132 & I took up the all night to get the indicators back to that quotation. All night long the streets were full of people. Every Grocers office was brilliantly lighted & all hands were at work. The Clearing house for gold had been swamped & was all mixed up. No one knew if they were bankrupt or not. ~~It was a~~
~~terrible~~

While a revolution on the Grand Trunk. There was a grand dance of the train men's fraternal organization which I attended. The dance kept all night. I knew that the irregular freight train would leave about 2 hours after the regular train & that probably would be all right. I declined to stop over here if I could get a chance to run the freight engine a few miles. I was

Very anxious to do this, I had been
allowed to fire & cover handle the
small sticks of wood expertly &
keep them up & also now and then I
would be allowed to switch a freight
car around to the freight shed to
unload small batches of freight,
but I wanted to get a chance
for a long run.

⁵ ~~So~~ ^{sure} enough both the Engineer & Foreman
 were tired and very sleepy from the
 good sleep they had taken, I got the
 Engineer ~~to~~ to consent to
 allowing the Foreman to run the Engine
 as it was the morning the Eng. was ^{about} to stop.
 The Eng.'s way out of a ^{series} of ^{trouble} ^{trouble}
~~was~~ ^{was} leased to the GTR by
 the Chicago Burlington & Quincy R.
 It had bright brass bands ~~all~~ all over the
 beautifully painted everything
 highly polished which was the
^{engine} ^{up} to the time old
 Commodore Vanderbilt stopped
 it on his road after running about
 15 miles the ^{firm} ^{could} ^{keep} ^{him}
 En. open & he agreed to permit me to
 run the Engine -

I took charge, reducing the speed to about 12 miles an hour + brought the train of 7 cars to her destination at the Grand trunk junction safely, but there was something occurred which was very much out of the ordinary.

I was very much worried about the boiler + I knew that if it got slow the boiler was likely to explode. I gathered this from hearing conversation among the Engineers so I kept constantly near the engine, watching it keeping her full of water. I hadnt gone more than 20 miles before black damp ~~and~~ wind blew out of the stack + covered every part of the engine including myself. I was about to awaken the fireman to find out the cause of this when it stopped. Then I approached a station where the ~~fire~~ fireman always went out to the Cowcatcher + opened the oil cup on the steam chest + poured oil in. I started to carry out the procedure when upon opening the oil cup ~~the~~ the steam rushed out with a

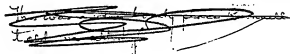
humid noise nearly knocking
me off the Engine, I succeeded
in closing the oil cup & got
back in the Cab & made up my
mind that she would ~~pull~~ ^{run} ~~there~~
without oil. I had afterwards
learned that the Engineer always
shut off steam when the fireman
went out to oil, the point I failed
to notice, my powers of observation
was very much improved after this
occurrence - Just before I reached
the junction another outflow of black
smoke occurred & the whole Engine
was a sight so much so that when
I pulled into the yard, everybody
turned out to see it laughing
immoderately. ~~The~~ I found out
the reason of the smoke was that
I carried so much water it
carried over into the stack & this
washed out all the accumulated
soot,

One afternoon about a week before Christmas our train jumped the track near Utica 4 old Michigan Central Cars with rotten sills collapsed in the ditch & all went to pieces distributing figs raisins dates & Candies all over the track & ditch, ~~there~~ I started out to save all I could of this by eating it, our family doctor had the time of his life with me in this connection,

Just before the war broke out there came to the train one afternoon in Detroit 2 fine looking young men accompanied by a colored servant they bought tickets for Port Huron the terminal point for the train. After leaving the junction just outside of Detroit I brought in the Evening papers, the train was called the Adcock train & there was only 1 passenger car -

When I came opposite the 2
young men one said, boy what
you got I said papers all right
then he took them & threw them out
of the window & turning to the
Colored man said Nicodemus
pay this boy. I told him the
amount & he opened a satchel
& paid me ~~9 dollars~~ the passenger
didn't know what to make
of this transaction & I returned
with ~~some~~ the illustrated papers &
imagines these were signed
threw out of the window &
I was told to get my money of
Nicodemus - I then returned with
all the ^{rest} magazines & novels I had not
been able to sell thinking perhaps
this would be too much for them
I was small of them & the lawyer reached
above my head & all I could possibly
carry. I had prepared a list & gave
the amount in case they bit again
When I opened the door all the
passengers roared with laughter
I walked right up to the young man
He asked what I had, I said

Magazines & Novels he promptly
threw them out of the window &
Nicodemus called - then I came in
with Cracked Hickory nuts. Then
pop Corn balls & finally Malassum
Candy - all went out of the window
I felt like Alexander the Great & had
no more chance, finally I put a rope
to my ^{the car} trunk which was about the
size of a Carpenters Chest
& started to pull this from the
baggage Car to the passenger Car
It was almost too much for my
strength but finally I got it in front
of the car & pulled up my Coat
Sleeves & laid them on the chest
then he asked what have you got
Goy I said everything sir that I
had gave that for sale, the
passenger fairly jumped with
laughter - Nicodemus paid
me \$24. for this last sale &
threw the whole out of the door
in the rear of the Car. These
men were from the South - I have
already retained a soft spot in
my heart for a Southern Gentleman



When I had charge of the Gold Indicator
I spent my evenings with the night staff
at the French Cable office which
was at that time in Nassau street.

Bunnell was somewhat inventive & was
talked on all kinds of electrical
applications possible. Bunnell
afterwards established a ~~factory~~
factory for the manufacture of telegraph
apparatus in NY which was successful
& still in existence although
Bunnell has passed away.

Bunnell was a fine operator &
worked in the U.S. Military Telegraph
when I was in the department at
Washing. Bunnell was ^{with me} at
at Chattanooga, Tenn. when
it was reported that Hood

was marching on Nashville.
About 11 o'clock one night a few came
into the office in great excitement
having heard the Hood rumor
& wanted to send a message
to save his goods he being a large
dealer. Bunnell told him it was as

impossible that orders had been
given to send no private messages
then the Jew started in to
tell Bunnell who absolutely
refused for the reason as he ~~said~~
the Jew he might be ~~so~~ countermanded
to get friendly when the Jew got
up to \$800. Bunnell swore him
secret & sent the message.
Now there was no such order & the
Jew finding it out & complaining to
Capt Van Duzer the Chief of the
telegraph, who investigated the matter
& while he was doing his change Bunnell
kissed him off indefinitely. Van Duzer
was so lenient that if another was
divulged all he had to do was to wait
3 days & then go & get on the ship
off Van Duzer's office all day
& he would be taken back but
Van D. swore he never would give in
in Bunnell's case. he said if Bunnell
had taken the \$800 & sent the message
at the regular rate which
was 25 cents it would have
been all right as the Jew shined

be punished for trying to bribe a
Military Officer but when Bunnell
took the \$500 then sent the message
Deadhead he could not stand it & he
would never relent.

One night I was walking up
Grandway & went into Johns museum
of Anatomy which place I always
wished I had never entered in this.
Places were all kinds of ~~cor-~~ bodies
& parts thereof mangled in wax
many of them illustrating the
Extent of flesh be certain
malignant diseases. The place
had many vases filled with
Tuberoses which gave an overpowering
smell for 2 days I could not
eat a thing & to this day the
smell of Tuberoses will spoil my
appetite ~~for~~

After the breaking out of the war
There was a regiment of Volunteer soldiers
quartered at ~~the~~ ^{the} reservation
extending to the boundary line of our
house & the barracks was at the
end ~~further~~ from the house
Sentinel were stationed ~~at~~ at
various distances along the
reservation nearly every night
We would hear a call such as
"Corporal of the guard No 1"

This would be repeated from
Sentinel to Sentinel until it
reached the barracks
Corporal of the guard No 1 would come
the who was wanted
Myself & the little Dutch boy
~~after~~ after returning from
the town after selling our
papers thought we would
take a hand at Military affairs
So one night when it was
very dark I shouted Corporal
of the guard No 1. The second

Resting thinking it was the terminal
point that Condit revealed it
to the 3rd & so on. This ~~was the~~
brought the Corp along the 1/2 mile
only to find ~~that~~ he was fogged
we tried this 3 nights but the 3rd
night they were mistaking & caught
the little Dutch boy & took
him to the lock up at the fort
& shut him up. They chased me to
the house & rushed for the cellar
in one small apartment. There were
2 bbls of potatoes & a 3rd ~~one~~ one
nearly empty. I poured these remnants
into the other bbl sat down & pulled
the bbl over my head bottom up.
The soldiers had awakened my father
& they were searching the cellar for
me with candles & lanterns.
The Corporal was absolutely certain
I came into the cellar & Condit
saw how I could have gotten out
& wanted to know from my
father if there was no secret
hiding place or assurance
of my father that there was
not he said it was most

Etymology - I was glad when
they left us I was annoyed
the potatoes were rotten still had
been in the 66's & violently offensive.
The next morning I was found -
Ged & received a good switching on the
legs from my father. The 1st of July
and I was released from him.
Although my mother kept a switch
behind like old Seth Thomas clock
that had the bark worn off, my
ideas & hers differed at times ~~when~~
Especially when I got ~~exposed~~
The Dutch Boy was released
the next day.

When I was a small boy at Milan
about 5 year old I + the son of
the proprietor of the largest store
in the town whose name was about
the same as mine went down in a
gully ~~and~~ in the outskirts of the
town to swim in a small creek
after playing in the water a while
the boy with me disappeared in
the creek, I waited around for
him to come up but as it was
getting dark I concluded to
go but no longer went home
Some time in the night I was
awakened & asked about the boy
It seems the whole town was
out with lanterns & had heard
that I was lost search with him
I told them how I had waited
& waited etc they went to the
creek & pulled out his body

While learning to telegraph I
+ a boy ~~named~~ named Clarence
built a telegraph wire ~~to~~ between our
houses, about a mile apart separated
by woods, the wire was that used
for suspending stove pipes the insulators
were small bottles pushed on ten penny
nails driven in the trees it worked
fine. My father had a neighbor named
Jos Symington a highly educated
abolitionist - they would ~~not~~
talk politics nearly every night
until I returned from town, which
varied from 11 to ^{one} 12 PM, I would save
one paper, but many nights when
I wanted to practice I would give
the paper to Clarence & then my father
would have to get the news over the
wire or not get it at all,
this generally resulted in going
to bed at 3 am,

Up to the time -!

~~Before~~ taking up telegraphy ~~on the~~
~~train~~ I had a Chemical Laboratory
on the train. A freight car had been
fitted up as a baggage car & one
end partitioned off as a smoking
deck. It was only 8 ft. long had a
table in the middle & 2 benches.
There was no ventilation & everybody
went into the baggage end to smoke
hence I had it all to myself.
Mr. Pullman had a small shop in Belmont
working on his sleeping car &
he made me a lot of wooden
apparatus for my Chemicals -
After I had done my train work I
would make Chemical experiments.
One day a bottle containing a
stick of phosphorus jarred off
on the floor & set it on fire.
The baggage master put it out
but the phosphorus would not
go out & he picked it up & some
put it on his fingers & everywhere.

he rubbed it it exposed a fresh surface & that got on fire & water wouldn't put it out. he got a bad burn & boxed my Ears so severely that I got somewhat deaf thereafter

This deafness has been of great advantage to me in various ways. When in a telegraph office I could only hear the instrument directly on the table at which I sat & unlike the other Ops I was not bothered by the other instruments. Again in experimenting on the telephone I had to improve the transmitter so I could hear it, this made the telephone commercial as the telephone because of Bell was too weak to be used as a transmitter commercially.

Also it was the same with the phonautograph. The great defect of that instrument was the poor rendering of the overtones in music & the hissing consonants

in speech I worked over one year
20 hours a day Sundays & all to
get the word specific perfectly
recorded & reproduced on the
phonograph, when this was done I knew
everything else would come be
done which was a fact,
Again, my nerves have been preserved
intact. Broadway ~~is~~ is as quiet
to me as a country village is to
a person with normal hearing.
~~I have not been able to hear~~
~~any sound since I was~~
~~born.~~

After I became a telegrapher I practiced
for a long time to become a rapid reader
I print & got so expert that I could sense
the meaning of a whole line at once
~~the~~ I believe I believe should be
taught in schools as it appears to
be easily acquired then one can
read 2 or 3 books in a day
whereas if each word at a time is only
sensed reading is laborious -

more than \$500. This electrician
appeared to doubt glory more than
money so it was an easy trade.
I brought my apparatus over &
was given a separate room with
Marble tiled floor which by the way
is very hard to sleep on, & started
in putting the finishing touches on.
After 2 months of very hard work
I got a detail at regular times of
8 Ops - we got it working well
from one room to another over
a wire which ran to Albany
& back - under certain conditions
of weather one side of the Audubonplex
would work very shaky & I had
not succeeded in ascertaining the
Cause of the trouble. On a certain
~~some~~ day when there was
a board meeting of the Co I was
to make an Exhibition test
The day arrived, I had picked the
best Ops in my alley were familiar

with the apparatus I arranged it
a storm occurred & the bad side
got shaky to do the best they could
draw ~~with~~ freely on their imagination
They were sending old messages
about 12 o'clock everything was working
but there was a storm somewhere
near Albany & the bad side got
shaky ~~for~~ Mr. Otton the president of
Wm. Vanderbilt & the other
directors came in, I had my
heart trying to climb up ~~around~~
~~the~~ ^{Desophagus} - I was paying
a sheriff 5 dollars a day to
withhold a judgment which had
been entered against me in a
case which had paid no attention
to ~~me~~ & if the董事 had
not worked before the president &
I was to have trouble &
might lose my machinery
but the Oros who stars they pulled
me through. The New York Times
(got it) came out next day
with a full account

It was the given \$500. which made
that easy to expect the whole
thing ~~to be closed up~~
but Mr. Oton went on an extended
tour just about the time I had paid
~~at the saddle some 2~~

for all the Experiments on the
Ground & exhausted the money
& I was again in arrears
~~but~~ in the meantime I had
introduced the apparatus
on the lines of the Co. where
it was very successful -

At that time The General
Supt of the WLL was David
J Eckert. It seems there was
great friction between Hickert &
Orton & Eckert was secretly
negotiating with Gould to
leave the WLL & take charge
of the Atlantic & Pacific
Goulds Co,

One day Eckert called me into his office & made inquiries about money affairs & asked him Mr. O'Brien had gone off & left me in charge. I told him ~~that~~ ~~he~~ was in straits, he told me I never would get another Cent but that he knew a man who would buy it, I told him of my arrangement with the Association, said I could not sell it to anybody but if I got enough for it I would sell my interest in any share I might get he seemed to think that pretty good agree to this I had a lot of Am. Druggery over in my shop 10 & 12 cords of & he offered to bring him over the next evening to see the apparatus. So the next evening Eckert came over with Mr. J. H. Hove & introduced him to me. ~~He~~ This is the first time I had ever seen him, I exhibited &

Explained the apparatus +
they departed ~~at~~ the next day
Eckert sent for me + I was taken
up to Goude's house which was
near the Windsor Hotel. In the
basement he had an office, it
was in the evening + I went
in by the servants' entrance as
Eckert probably feared that he
was watched -
Goude started in at once +
asked me ~~how~~ how much I
wanted, I said make me an
offer, then he said I will give
you \$30,000. I said I will
sell any interest I may have
for that money which was
somewhat more than I thought
I could get. The next morning
I ~~went~~ went with Goude to
Sherman's office +
received a check for \$30,000.
with a remark by Goude that
I had got the substantial Plymouth
Rock ~~for~~ as he had sold his for
\$30,000 + had just received the
check

There was a big fight on between
Gould Co & the Bell & this
transaction caused more
litigation. The Electrician on account
of the testimony lost his glory
the judge never decided the case
but went crazy a few months
afterwards, ~~for~~

In 1876 I started again to experiment
for the Bell & Mr. Otis, this time it
was the telephone, Bell invented
the first telephone which consisted
of the present receiver which was
used both as a transmitter & a
receiver, it was attempted to
improve it Commercially but
failed on account of its faintness &
the strident sound which came
in on the wires from various
sources. Mr. Otis wanted me
to take hold of it & make it
Commercial. as I had been

also working on a telegraph system
employing tuning forks. I
simultaneously with Gouth Bell
& Gray I was pretty familiar
with the subject, & started in
& soon produced the Carbon
Transmitter now universally used
~~the same~~ (see litigation on telephone
Patents, Judge's Opinion
~~that the same was already obtained~~)

Tests were made between N.Y. &
Phila also between N.Y. & Washn
using ~~the~~ regular Bell
wiring. The noises were so great
that not a word could be heard
with the Bell receiver when
used as a transmitter between
N.Y. & Newark. Mr. Ostin &
Wm. Vanderbilt's (the Board of
directors Western Union & Co.)
part in the tests. The Bell
then started in to put them on
private lines. Mr. Theodore Puskas
of Buda Pesth Hungary was the

first man to suggest a telephone
exchanges soon after exchanges
were established, the telephone
~~was~~ Dept was put in the
hands of Hamilton McKay
Twombly, Vanderbilt ~~son~~ eldest
son-in-law, who made a success
of it. The Bell Co in Boston
also started an exchange,
+ the fight was on the WLL
pirating the Bell receiver + the
Boston Co pirating the WLL
transmitter. About this time
I wanted to be taken care
of - I knew hints of this desire
then Mr. Oxten sent for me
he had learned that inventors didn't
do business by the regular process
+ concluded he would close it
right up. He asked me how much
I wanted. I had made up my
mind that it certainly was
worth 25000 if it was awarded
to anyone for central station
work - that was the sum
I had made up my mind

to stick to & get absolutely still
~~it~~ it had been an easy
job & only required a few months
I felt a little shaky &
uncertain, so I asked him to
make an offer, he promptly
said he would give me 100,000.
All right I said let's yours on
one condition & that is that
you do not pay it all at once
but pay it to me at the
rate of 6000 per year for
17 years the life of the patent.
He seemed only too pleased
to do this & it was closed.
My ambition was about four
edges too large for my business
capacity & I knew that I would
soon spend this money expended
if I got it all at once so I
found it so I couldn't, I saved
17 years of worry by this
stroke.

Soon after this ~~the~~ the Page

patent which had been in the
patent office for years was
finally issued it covered
~~the~~ use of a magnet - contact
point ^{in a magnet} there was no known
way whereby this patent
could be evaded & the possessor
covered essentially Central the
~~use~~ use of what is known
as the relay & sounder & this was
vital to telegraphy - Jones was
pounding the nail on the
Exchange, disturbing its
Railroad contracts & being
advised by his lawyers
that this patent was of great
value & bought it. The moment
Mr. O'Brien heard this he sent
for me & explained the situation
& wanted me to go to work
immediately to see if I could not
evade or discover some other means
that could be used in case Jones
~~got~~ sustained the patent.

It seemed a pretty hard job because there was no known means of moving a lever at the other end of a telegraph wire except the use of a magnet. I said I would get at it that night. In ~~examining~~ some years previously I discovered a very peculiar phenomenon, & that was that when a piece of metal connected to a battery was rubbed over moistened pieces of chalk resting on a metal connected to the other pole that when the current passed the friction was diminished ^{just} when the current was reversed the friction was greatly increased over what it was when no current was passing. Remembering this I substituted a piece of chalk rotated by a small electric motor for the magnet & connecting a switch. The combination claim of Page

was made worthless a hitherto
unknown means was introduced
in the Electric art, 2 or 3 of
the devices were made & tested
by the Company's Expert Mr. Orton
after he had me sign the patent
I got it in the Patent Office
I wanted to settle for it at
once, ~~but~~ HE asked my
price, again I said make
me an offer again he
named \$100,000 I accepted
providing he would pay it at
rate of \$6000 per year for 17 years
This was done ^{by the Company} & I received
12,000 yearly for that period,
from the W. H. Hill Co.

After this Jones wanted me to
help install the Automatic system
in the Atlantic & Pacific Co.
which I feel Eakins had been
Electric president,

The Co having bought the
Automatic Telegraph Co -
I did a lot of work for this
Co making Automatic Apparatus
in my Shop at Newark.
About this time I mounted a
District Messengers Encc Box
system & organized a Co. called
Up to me the Telegraph Co & started
into install the system in N York
I had great difficulty in getting
subscribers having tried several
Commissioners who one after the other
failed to get subscribers, when I
was about to give it up. The
last operator named Browne
who was on the Automatic Telg
Co was between my & Newark
which passed through my
Newark Shop, ask permission
to let him try & see if he could
get subscribers. I had very little
faith in his ability to get any
but thought I would give him
a chance if he felt certain of his
ability to succeed. He started

in 4 the results were surprising
within a month he had procured
200 subscribers & the Co was a
success, I have never quite understood
why 6 men should fail absolutely
while the 4th man should ~~so~~
~~not~~ succeed. Perhaps hypnosis
should be used for it.
This Co was sold out to the
Atlantic & Pacific -

While engaged in peering in the
Automatic system I saw a
great deal of Gould & frequently
went up down to his office
to give information ~~himself~~
Gould had no sense of humor, I tried
several times to get off a funny
story, but he failed to see any
humor in them. I was very fond
of stories & had a choice lot
~~and~~ always kept fresh & which
I could throw a man into convulsions.
One afternoon Gould sat down in
to explain the great future of the

Union Pacific RR which he then
controlled, he got a map & had
an immense amount of statistics
he kept at it for over 4 hours & got
very enthusiastic, why he should
explain to me a mere inventory with
no capital or standing I could not
make out. he had a peculiar eye
& I made up my mind that there was
a strain of insanity somewhere.
This idea was strengthened shortly
afterwards when the W.O.U. received the
monthly report of the stock tickers
Gould had one in his private office
which he ~~was~~ watched considerably.
This he had removed because the
price had ~~been~~ advanced a few
dollars & to his great annoyance
he raked over it. This struck me as
abnormal. I think Gould's ~~obsession~~
was due to abnormal development,
he certainly had one trait that all men
must have who want to succeed.
He collected every kind of information
& statistics about ~~the~~ ^{his} scheme or had

all the data, his connection with
was prominent in official life of
Czech & Co as ~~was~~ aware of was
surprising to say His conscience
appeared to be atrophied ^{just that attitude} ~~in fact~~
that he was endorsing with men
that were wrong. He worked incessantly
until 12 to 1 o'clock at night.
He took no pride in building up an
Empire, he was often money money
only, whether the Co was of success
or a failure mattered not to him
After he had hammered the little thing
his opposition Co he had tried out
Mr. Philbrick the latter retired
from Central & Gould went in &
dominated his Co & Controlled
the WPA. ~~Then~~ He then repudiated
the Central with the additional
Tough people & they never recovered
a Cent for their losses & Patient
I don't know of a very hard
but I have seen in the Courts for
25 years recently the Federal Court
disposed ^{then} against the Gould estate

& the estate may have to pay for
the weapons he used to get control
of the W.U. - When I heard of
the W.U. I knew that no further
progress in strategy was possible
so I went into other lines -

Towards the latter part of 1875
in the Newark shop I invented the
device for multiplying copies of
letters which I sold to Mr A B Dick
of Chicago & in the years since
it has been universally introduced
(throughout the world) it is
called the Mimeograph.

I also invented the device & introduced
paraffine paper now used universally
for wrapping up Candy etc,

In 1876 I moved to Menlo Park N.J.
on the PRR several miles below ~~the~~
Elizabeth.

The cause of this move was due
to trouble I had about rent &
had rented ~~at~~ a small
shop on the top floor of a

Purdlock factory and had rented it by the month ~~and~~ I gave notice that I would give it up at the end of the month and the rent moved out & delivered the keys shortly afterwards I have saved with it a paper probably a judgment within 3 weeks to pay for 3 months rent. There was a small law it seems that made a monthly renter liable for a year. This seemed so unjust that I determined to get out of a place that permitted such injustice & I moved.

In 1977 I invented the phonograph
the invention was brought about in this
way - I was experimenting on an
authentic method of recording
tough messages on I took up
paper laid on a revolving platter
Presently the name on the Disc
talking machine up to day
The platter had a vertical spiral
groove on its surface like the
Disc ~~of a phonograph~~

Over this was placed a circular disc of paper an electro magnet with an embossing point connected to an arm travelling over the disc & any signals given the magnet was embossed on the disc of paper. If this disc was removed from the machine & put on another similar machine provided with a contact point. The embossed record would cause the signals to be repeated into another wire. The ordinary speed of telegraphic signals is 35 to 40 words a minute but with this machine several hundred words were possible. From my experiments on the telephone I knew of the power of a diaphragm to take up sound vibrations as I had made a little toy which when you breathed softly in the funnel would work a point connected to the diaphragm of a telephone & this engaging in

a watch that wheel served to
give continuous rotation to a
tumbler. This pulley was connected
by a cord to a little paper toy
representing a man sawing wood
when it was started. Many
had a little hand etc. the paper
man would start sawing wood
I reached the conclusion that if
I could record the movements of
the diaphragm properly I could
cause such record to reproduce
the original movements in regard
to the diaphragm by the voice
this succeeds in recording or
reproducing the human voice

Instead of using a disc I
designed a little machine using
a cylinder provided with
grooves around its surface -
also this was to be placed
in a box which would receive
and record the movements of
the diaphragm. A sketch of
was made at the piece work price
of \$18. was marked on the sketch

I was in the habit of marking
the price I would pay on each
sketch if the workman lost -
would pay his regular wages
if he made more than wages -
he kept it.

The workman who got the
sketch was John Brezgi who is
after years became Chief
Engineer of the Great Lakes C.
~~Co.~~ I don't have much faith
that it would work expecting that
I might possibly hear a word or
so that would give hope of a
future for the idea. Brezgi when
he ~~had~~ had nearly finished
it asked what it was for
I told him that I was going
to ~~see~~ Record talking of them
have the machine talk back.
He thought it absurd. However it
was finished. He said put on
I then showed Mary had a little
and etc. I quoted the
reproduction of the machine
reproduced it perfectly.

I never was so taken back in
my life. Everybody was astonished.
I was always afraid of things
that worked the first time
long experience proved that there
was great drawbacks generally
found before they could be
got commercial but here
was something that there was
no doubt of -
I worked at it all night & we
fixed it up to get the best results.
That morning I took it over to
New York & walked into the office
of the Scientific American & walked
up to Mr. Redeker's desk & said
I had something new to show him.
He asked what it was & I told
him I had a machine that
would record & reproduce
the human voice. I showed
the package set up the machine
& started Mary there &
reproduced it so it could
be heard all over the

Room. They kept me at it until the
crowd got so great that Mr. Beach
was afraid the floor would
collapse & we were compelled
to stop. The papers next morning
contained columns, none of
the writers seemed to understand
how it was done & I tried to explain
it was so very very simple but
the results was so confusing
that they probably made up
their mind beforehand that they
never could understand it
& they didn't.

I immediately started making
several large & better ones which
I exhibited at Meigs park to
crowds. The PRR ran special
trains. Washington people
telegraphed me to come out.
I took a phone to Washington
& exhibited it in the rooms of
Blaine, Meice, members of Congress
& the notable people of the city.
Came all day long until
late in the evening -

I made on break. I visited Mary &
another ~~was~~ ^{very} pretty. There was a
little girl & she had a little curl
right - I knew it. ~~of her forehead~~
When she was good she was
very very good but when she
was bad she was horrid. It will
be remembered that Senator
Roscoe Conkling then very
prominent had a curl on his
forehead & all the characterist
developed it abnormally - he
was very sensitive about the
subject. When he came in he
was introduced but being rather
dark I didn't catch his name
but sat down & started the
the curl story. Everybody laughed
& I was told Mr C was displeased
about 11 at night word was
received from President Hayes
that he would be very much
pleased if I would come
up to the White House

I was taken there & found Mrs. Hays
& several others waiting and
then I remember Carl Shurz
who was playing the Piano
when I entered the room
The exhibition continued till about
12:30 am when Mrs. Hays &
several other ladies ^{with} had been
made to get up & dress again
I left at 2:30 am -
For a long time some people thought
there was trickery. One morning
at Menlo Park a gentleman
came to the laboratory & asked to
see the phonograph. It was Bishop
Vincent ~~of St. Louis~~ ^{who with}
Lewis Miller was the founder
of Chautauque - I exhibited
it & when he ~~was~~ ^{asked}
if he could speak a few
words. I put on a French dail
& told him to go ahead &
commenced to quote biblical
names with immense rapidity
On reproducing it he said
I am satisfied now, there was

a man in the US who owned
rects those names with the same
rapidity —

After my return from the
Eclipse of the Sun (you have this which)
I went with Prof. Barker ~~at the~~
~~prof. of~~ Physics in the
University of Pa. to Chandler
Prof. of Chemistry in Columbia
College to see Mr. Wallace
a large manufacturer of Prisms
at Ossonge Conn. — Wallace
at this time was experimenting
on series are light just
at that time I wanted to take
up something new & Prof.
Barker suggested that I go
to work with him & I could go
subside the Electric Light
so it could be put in small
units like you —
On my return home I started
my usual course of collecting
every kind of data about gas

Note = did you receive
from me account of my
Experiments in Automobile
Tel. in the Phila. P.O.
Tel. - 1873 -

bought ~~the~~ all the transactions
of the Gas Engineers Society etc
all the back volumes of Gas
Journals etc. Having got all the
data + investigated Gas jet distribution
in N.Y. by actual observation.
I am by my mind that the
solution of the problem of the
distribution of this electric light
would be solved + made commercial.

At Manila Park, while work
on the ~~telephone~~ ^{planning} ~~the~~
~~phone~~ ~~the~~ ~~the~~ ~~the~~
~~the~~ ~~the~~ ~~the~~ ~~the~~
I made an arrangement
with Col. Howard of London
to make a telephone to be used in
starting the industry in England
& the Continent. A large number
was made and the ~~the~~ ~~the~~
~~the~~ ~~the~~ ~~the~~ ~~the~~
who started to put up a
telephone exchange where he
had proceeded a little way

He was threatened with a lawsuit
by the owners of the Bell Patent.
The Bell Co. were starting an
exchange themselves & had cabled
me that the lawsuit would
prevent him from obtaining further
money to carry out the
Enterprise. ~~But~~ he would stop
without I could evade the
Patent on the Bell Instrument.
I ~~Cable~~ thought I could do
so & went right to work. I
again had recourse to the
phenomenon discovered by me
years previous that the friction
of a rubbing electrode passing
over a moist chalk surface
had its friction varied by acting
the C. & T. I devised a
Telephone Receiver which
was afterwards known as
the J. J. speaking Telephone
or Chalk Receiver. This was
no magnet simply a diaphragm
& a small cylinder of ~~chalk~~

Compressed chalk about the
size of a Thimble, an arm
adjusted to the center of the
diaphragm extended outwardly
& rested on the chalk cylinder
a was pressed against it
with a pressure equal to
that which would be due
to a weight of about 6 lbs.
The chalk was rotated in
hand. The volume of sound
~~with~~ was very great. A
person talking with a Carbon
Microphone in my hand his
voice so amplified that he
could be heard 1500 ft
away in an open field at Wash. D.C.
This great excess of power was
due to the fact that the
power came from the person
turning the handle the voice
instead of furnishing all
the power as with the present
receiver merely controlled
the power just as an engine
working a valve could

Central a powerful Engine -
I made 6 of these receivers
~~and~~ sent him in charge of
an Expert on the first steamer
they were received & tested
& ~~finally~~ afterwards shipped
one hundred or more, at the
same time I was ordered to
send 20 young men after
teaching them to become
Expert I set up an Exchange
around the Laboratory of
10 instruments, I would then
go out & get each one out of
order in every conceivable way
a man would be sent to
each to find the trouble.
When he could find the
trouble 10 consecutive times
within 5 minutes each he was
sent the London about 60 men
were used to get 20
~~But~~ Before all had arrived
the Bell Co seeing that we
could not be stopped

Entered into negotiations for
Consolidation, one day I received
a cable from London offering
30,000 for my interest. I
cabled back that I would
accept ~~either~~ the draft
case I was accustomed to
find that it was for ~~the~~
30,000 pounds when I thought
it was dollars -

Then men I sent over were
used to establish telephone
exchanges all over the
Continent & some of them
became wealthy. It was
among this crowd in London
that Bernard Shaw was
employed before he became
famous - The ~~London~~
the Chalk Telephone was ^{finally} discarded
in favor of the Bell because
it being more simply ^{and} cheaper.
Extensive litigation followed
the Carbon Monoxide patent
was sustained & preserved
the monopoly of the telephone.

in England for many years
Bell's patent was not
sustained by the Courts,
Sir Richard Webster now the
1st Chief Justice of England was
my Counsel & sustained all of
my patents in England for many
years. Webster had a marvellous
Capacity for understanding things
Scientific & his address before the
Courts was indeed striking. My
Pis ~~was~~ ^{is} ~~not~~ ^{is} ~~highly~~
opinioned. My experience of the
Legal profession, is that scientific
subjects are distasteful & it is
rare in this Country for a Judge
to interpret the statements of
the Experts. Correctly & wrongly
scarcely ever get a decision in
their favor. In England the
Judges seem to be different. They
are not fooled by the Experts
but treat their testimony all to
pieces & decide the Case
Correctly. Why this difference
between English & American judges
I cannot explain.

It seems to me that scientific
disputes should be decided by
Some Court containing at least
one or two scientific men -
If justice is ever to be given
an inventor. Inventors acting as
judges would not be very apt
to decide a ~~proper~~ complicated
law point & particularly it is hard
to see how a lawyer can decide
a complicated scientific point
rightly. Some inventors complain
of our patent system & the patent
office. I consider both are good
& that the trouble is in the
Federal Courts. There should
be a Court of patent appeal
with at least two scientific men
thereon who could not be
blind to the Sophistry of
paid experts, men whose invention
would have created wealth to
the country if Millins have been
~~in the way~~ prevented from
making any money which
they could determine their

Careers as creators of wealth for
the general good just because the
Experts befuddled the judge by their
misleading statements,

While I was in
~~the~~ ~~from~~ Newark ~~the~~
~~the~~ I discovered a peculiar
phenomenon which was unexplainable
until years after, — Beard of NY
a prominent scientific man called
it a new force & named it Ethereal
force, the principle phenomena
was shown by breaking the circuit
of a magnet when a spark was
noticed passing between two carbon
points in a dark box, both points
being short circuited by a loop
of wire & this spark could
be obtained any where in the
vicinity of a magnet ~~where~~
or drawn from gas pipes any where
in the building. Whatever passed
through the isolated circuit
would not affect the most
delicate detectors of electricity

Beard published a description
of the phenomenon in the Journal also in the

Ref. Journal

It was published in various
Electrical Journals. The apparatus
was shown in operation at the
Electrical Exhibition at Paris in

Lord Kelvin knew of the
phenomenon but could not give an
Explanation. ^(Get years) ~~Get years~~ years

afterwards, Hertz brought out a
paper, using the Clark box &
other devices & clearly explained
the whole matter, which
opened up the possibility
of Wireless Telegraphy =

Mention of two Beard's articles &
was found in sketches etc

in 1874 at Menlo Park I got up
a device which I called a
Megaphone. It consisted of
2 L. B. G. funnels of ^{the same} shape
determined experimentally these
were connected together & to a
listening tube the ends of

which were inserted in the ear
with this instrument talking
could be heard a distance of
3 miles -

Experiments were also made
with Kites and induction coils
to endeavor to transmit Morse
signals to a distance of 25 miles
then on a telephone ~~system~~
one mile was the greatest
distance we could send signals
without a wire. afterwards I
applied this idea to moving train,
to permit sending messages
from a moving train to the terminal
station on the road. This
system was installed on the
Adirondack Valley road & was used
for a number of years on
Contra Costa trains -

(Mendocino can get messages
account of C. P. Keel from a
passenger train)
I also applied it to ships

for sending messages at sea
after Hertz's paper Marconi
applied the knowledge thus
conveyed to wireless telegraphy
with Marvellous results, the
Marconi Co purchased my
patent

At Menlo Park one day a farmer
came in & asked if I knew any-
thing to kill potato bugs he
had 20 acres of potatoes &
the vines were being destroyed
I sent men out & called 2
quarts of bug & tried every
chemical I had to destroy them,
Bisulphide of Carbon was
found to do it instantly
I got a Drum & went over to
the potato farm & sprinkled
it on the vines with a sprinkler
pat every bug dropped dead
The next ~~morning~~ the farmer
came in very excited & reported
that the stuff had killed the
vines as well, I had to pay

#300. for not experimenting properly

At Mendocino on cold winter night
He came into the Laboratory a
^{strange} man in a most pitiful condition
1 he was nearly frozen & he asked
if he might sit by the stove
in a few minutes he asked for
the head man & I was brought
forward. He had a head of
abnormal size with highly
intellectual features & a very
small & emaciated body. He
said he was suffering very
much & asked if I had any
morphine, as I had about everything
in chemistry that could be
bought & told him I had
he requested that I give him
some so I got the Morphine
sulphate. He poured out
enough to kill 2 men when
I told him that we didn't
keep a hotel for suicides

He then bent the quantity down
he then bared his legs & arms
& they were literally pitted with
scars due to the use of hypodermic
syringes he said he had taken it
for years & it required a big
dose to have any effect,
I let him go ahead in a short
while he seemed like another
man & commenced to tell
stories, there was about 50
of us sat around listening until
morning. He was a man of
great intelligence & education
He said he was a Jew but there
was no distinctive ~~mark~~ feature
to verify this assertion,
He continued to stay around
until he finished ~~some~~
Every combination of Morphine
with an acid that I had
probably 10 oz. all told
then he asked if he could
have strychnine, I had

an oz of the Sulphate
he took enough to Kill a horse
& wanted it to have as good
Effect as Morphine.
When this was gone the only
thing I had left was a
chunk of Crude Opium perhaps
2 or 3 lbs. he chewed this up
& disappeared. I was greatly
disappointed because I would
have laid in another stock
of Morphine to keep him at
the Lab - About a week
afterwards he was found
dead in a Barn at
Pentth Amboy.

M.M.L.

**William H. Meadowcroft Papers
Reminiscences by Edison
H. Mr. Edison's Impressions of Europe**

This document is a combination of original typescript pages and carbon copies. At the top of the first page is an inscription in William H. Meadowcroft's hand: "Mr. Edison's Impressions of Europe." The document consists of fifteen pages of observations about Europe and Europeans, which were made by Edison after his return to the United States in October 1911. Meadowcroft gathered these impressions for publication, and the scattered corrections and additions to the text are in his hand. Neither a complete original typescript nor an original Edison manuscript has been located.

Mr. Edison's Impressions of Europe [1911]

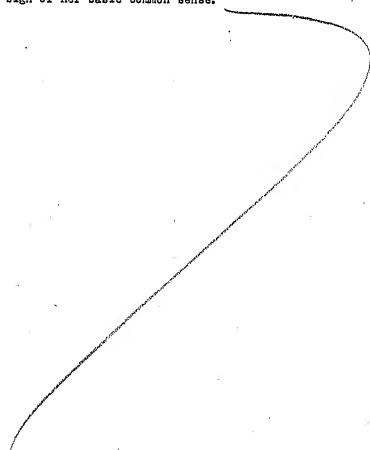
For the first time in twenty-two years Thomas A. Edison has taken a real vacation. Starting on August 2nd by the Mauretania with his son Charles, he went to England to join Mrs. Edison and their daughter Madeline and son Theodore for an automobile trip in Europe, returning to New York on October 7th. Believing that the readers of Popular Electricity Magazine would be interested in Mr. Edison's impressions of his foreign trip, a correspondent called upon him at his laboratory in Orange, New Jersey, and found the great inventor looking rugged and well, and although extremely busy, willing to grant an interview.

When asked to mention the most interesting experiences of his European trip, Mr. Edison smiled and said, "That's a large order, and I don't know that I can fill it, but let us begin at the beginning.

"One of the first things I did on arriving in England was to visit the House of Commons where they were holding an all night session and where I saw two votes taken on the Bill relating to the House of Lords. A seat was given me in the Strangers' gallery. I could see, but, of course, could not hear the speeches. It was all very interesting but there was no excitement. After the House adjourned everyone went out on the Terrace, where I was introduced to a great number of the statesmen. They presented me with a copy of the Lords' Veto Bill signed by Prime Minister Asquith, Lloyd George, John Redmond, John Burns, T. P. O'Connor and others. I was invited to visit the House of Lords the next day but could not spare the time as I had arranged to meet my wife in France.

"Next to Americans the English have the best practical brains. I like the English and admire their institutions and statesmen, and the way the country is run. They are strong on ancient traditions, but they are fast realizing that mere hereditary institutions must go.

When I was in England a great railroad strike began, but the Government realized that it had a duty to perform to stop disorder, and it acted firmly. Governments are merely huge business concerns, and no allowance for sentiment should be made in their practical dealings with the affairs of the world. In this case England took energetic measures to insure the right of the individual to work for whatever wages he pleased, despite the tyranny of labor societies, and I think it is a healthy sign of her basic common sense.



"Motoring through France is a source of unbounded pleasure. I have seen no superior roads anywhere. I traveled over more than 2000 miles of roads there and less than three miles were bad. There was not a rut more than two inches deep. We are far behind the French in this respect, and our American road engineers can get some valuable pointers from France.

"I was disappointed, however, in Paris as the so-called 'City of Light.' It bears no comparison to New York in

that respect. The Champs Elysees, which is the most brilliantly illuminated street in the city, looks like twilight compared with Manhattan's 'Great White Way.' Paris is ever a wonderful city. There is much to interest the visitor, and I took no small pleasure in revisiting the familiar scenes of years ago, but my stay in the city of magnificent prospects was very short.

I did not visit any of the great scientific institutions, the purpose of my trip being to see the country.

The historical monuments of Paris do not impress me.

I see them resting on the bones of countless victims of Napoleon's personal glory. Conquest costs; it never pays. The Germans have paid more than a thousand dollars an acre for Alsace and Lorraine, and they thought they had gained it free. Their little march around the Arch of Triumph was in the end the costliest promenade ever made. The glory of the war lord, wherever he may be, is fading away. There is too much independent thought, too many

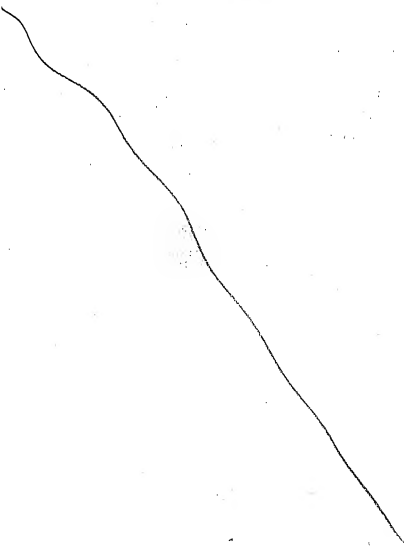
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newspapers and schools in our present day of civilization to permit of the antiquated methods of these overambitious men who, hiding behind their selfish arms, cry loudly for the glory of their country and force ruin on their people. The terrible price of war would be clear to coming generations if every monument had inscribed upon it the details of its cost to the people. The war game has received a solar plexus blow, anyhow, in the coming of the aeroplane. A thousand aeroplanes would cost less than one Dreadnought, but think of the frightful effect of a fleet of a thousand airmen dropping nitro-glycerin bombs. Another great international war in Europe seems impossible now so far as I can see. In other words invention has got beyond the thirst of blood; the power of science, that has been let loose must overwhelm aggressive diplomacy. Although Europe has learned her economic lesson, the subject of war seems to be over in ^{the} ~~our~~ minds of her people.

"But returning to more pleasing subjects than war, let me say that I enjoyed my tour through France. Its beautiful scenery is restful, and its agricultural richness is very impressive. I was amazed at the beautiful crops of wheat, barley and other small grain. There were no such extensive fields of one kind of grain as we see in our western states, but cultivation is done in small acreages. A few acres of wheat, with a similar patch of oats adjoining it, and so on, but all in the highest state of perfection. The farmers are successful and well to do, and it was not difficult to discern one reason of the wealth of France. The vast vineyards were particularly interesting. Unfortunately it did not happen to be the time for gather-

5
ing the grape crop. I would like to have seen it, for I understand they make a great holiday of the occasion.

~~"France is a nation of people who not only possess a high order of intelligence, but they are shrewd and thrifty. Every-~~
where



-8- 6

we went on our motor tour we found the people apparently happy and contented. They have savings in plenty, but they put the money out in ~~government bonds.~~ ^{foreign interest.} Land investments with them are practically nil. I was struck with the lack of new buildings going up. The peasants are certainly geniuses in making the most of a tiny strip of land. In one small farm I counted no less than seven different kind of crops. The apple orchards of Normandy astonished me by their wonderful crops of ruddy apples ~~as fine as the best we have.~~

"The French bread struck me as particularly good. It was palatable and nutritious and I ate a great deal of it while in the country. The French are wiser than we in not seeking to make their bread dazzlingly white by sacrificing the nutritive parts of the wheat. Their skill in cooking is apparent everywhere, for even in the smallest villages everything that was served had the magic of their art.

"Switzerland is a country of magnificent scenery and practically unlimited power going to waste. In motoring it is quite a change to leave the beautiful French roads where one can speed and get into Switzerland where sixteen miles an hour is the limit. The people are progressive but lack the daring in business that is characteristic of the Anglo-Saxon. They are hampered by over-prudence. In some respects they remind me of the Japanese, for their genius shows itself in minute sorts of labor. They are a little people in a little land. As far as I can judge, they are more intricate in invention than in mind. Their watches, clocks, music boxes, wooden toys, and what not, — everything is little. We showed them how to make Geneva watches by machinery, and now they are imitating us in their own country. But occasionally a great engineer will arise among them. One is my friend Turitini, who constructed the great power works on the Rhone.

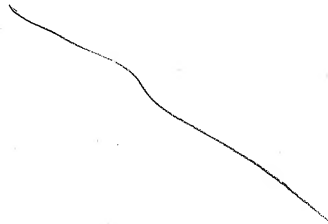
"Cheap electricity is waking up Switzerland, and there are some signs of growth. You will find new buildings going up, which cannot be said of all the countries in Europe. It is to be hoped that the Swiss will soon be so thoroughly awakened that the dreadful spectacle of women harnessed to the plows, yoke-mates with cattle will be a thing of the past.

"Bohemia was a surprise to me. I had not expected to find much progress there but was agreeably disappointed. New construction was in evidence not only in the larger towns, but even the smaller towns are extending somewhat. Most of the old houses are built up to the sidewalks and there are no gardens or lawns in front, but the modern houses are different, and one sees flowers in the front yards. Perhaps this may be due to the influence of Bohemians who have returned to their country with a competence made in America, and have taken American ideas with them. There is a general tendency in Bohemia toward commercial and manufacturing development on a larger scale than ever before. Many factories are in course of construction. But the country is at present handicapped by ill-feeling between the laity and the Church, which must work itself out before any great progress can be made. I was struck with the fact, here, as elsewhere, that the European farmer makes more out of less promising land than ours by intensive farming. Over there they spend their time and energy in carefully cultivating small areas instead of crudely cultivating

large areas as many of our farmers do. Nothing in the way of land goes to waste in Europe. Even the roadside is lined with fruit trees, principally apples, then come pears, then cherries. Ninety-nine per cent of such ^{land} goes to waste with us. The Bohemians grow great crops of apples. ~~I calculated that~~ there must be at least 250 square miles of the country devoted to apple growing. Their fruit is not as good as ours, however, being smaller and mostly used for the manufacture of champagne, vinegar, etc.

"In travelling through France I found myself looking always for the nation's factories but generally in vain. Of course, she has her factories and plenty of them, but her manufactures, generally speaking, are artistic in nature, high in value and small in bulk. Hence, they do not require large machinery to produce them. On coming into Germany one immediately sees evidence of its being a great industrial nation. I saw more factory chimneys in the town of Chemnitz alone than in the whole of France.

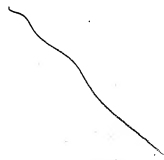
"It seems like a humiliating thing to say, but it is the fact that Germany's manufacturing industries are pushing ahead much faster than ours are. The growth of her manufactures is constant and tremendous.



"Thousands of factories are in course of construction. I saw many factories in North Germany, and whether they were built or in building, the construction generally speaking was better than the construction of the best of ours. Their building methods are extremely sensible, economical and effective. They use cement more freely and more wisely than we do. One sees everywhere buildings of loose stones faced with cement which fills in the interstices.

"Every detail of factory construction over there is hedged about by carefully restrictive laws which are rigidly enforced. The consequence is well built buildings, safe, sanitary and admirable. There is very little danger of fire in such buildings. I was told in Prague that the city's fire loss in one year was only \$26,000. The fire horrors which are continually occurring in America are impossible. The construction of the buildings is such, that the workmen's health is carefully protected; they have fine light and air, and in the arrangement and management of the machinery they are carefully protected against accident. We have many things to learn from Germany in these details of factory equipment, construction and management.

"When our American people realize that the average depreciation on an average building



is 3 per cent as against one-half of one per cent in Germany, they will wake up and throw aside tradition and take a lesson from our German friends who make liberal use of cement as a building material. We are apt to think of them as being slow and conservative. They are certainly conservative, but in that respect they have forged ahead and made haste economically.

"Germany is up to date in all branches of mechanical and scientific advance. She is not behind us in these lines, generally speaking, although her shops are full of American machinery or imitations of it. I went through two great electrical shops in which 85 per cent of their machinery was American. This illustrates the good sense of the Germans. While Germany is the most scientific of all the nations, she does not approach us in applied science. She is pre-eminent, however, in some lines. In chemical industries she stands alone. ~~But, here, again, her chemical laboratories and factories are full of American machinery.~~ In automatic labor-saving devices of all kinds and in their application we excel her.

"The Germans are the world's most persistent people. They usually get what they are after, and they have started now to capture our mechanical prestige. If the United States is to prevent them from outstripping us in the race, we shall have to get down to hard, intelligent work.

"The German domestic trade is enormous, but from indications in the packing rooms of several large German factories which I visited, I should say their foreign trade is still larger. They are organizers of great ability and extraordinary

(10-1/2)

patience and are wonderfully energetic and intelligent. Not only are they fighting us for the world's trade, but they are also fighting England wherever she has business that they want, and they have engaged in a persistent campaign for the world's business. This campaign is not sensational, but there is no slackening up of it. If we are going to hold our own or win out, we should watch them closely, for there is much in their methods that we

(11)

could learn with profit.

"They have gone so far as to establish banks with German capital in all parts of the world for the purpose of assisting resident German merchants, thus Germany not only exports goods and makes the profit from their sale abroad, but furnishes the necessary banking facilities, also highly profitable, through which the business is conducted, *this is under the control of German ship.*

"Another thing in Germany impressed me greatly, and that is one great advantage which their manufacturers have over us and every other country. I refer to her great promoting banks. In our country a man desiring to put something new on the market must have a promoter of his enterprise, and our promoters are notoriously irresponsible. In Germany inventions are brought out by the promoting banks.

"For instance, The Deutsche Bank, which is one of the largest banks in the world, has a corps of engineers and auditors ready to investigate any proposition. An invention is taken to them. If after most careful investigation it proves likely to be useful and profitable, the money to push it is forthcoming. The financial and technical investigation is rigid, but if the idea stands that test, the capital is ready. *to assist the inventor*
"A manufacturer wishing to extend his business can ~~also~~ get money ~~in the same way~~ promptly at a reasonable interest if he can prove that his ~~proposed~~ ^{the proposition} extension will be profitable. It saves time and keeps him out of the clutches of sharks.

"A good part of this plan is that the bank will carefully watch the progress of the invention ~~and~~ ^{and} the manufacturer, and will place ~~its~~ ^{the} stock on the Exchange, and when it

has arrived at a certain point of prosperity, will take its money back, ^{when it gets} ~~making~~ only a fair profit for its use. This leaves the inventor or the manufacturer with his invention and factory in his own hands to proceed alone without encumbrance. This shows the wisdom that the Germans exercise in providing the utmost encouragement to their inventors and manufacturers, and I predict that it will soon put the German Nation in advance of us in the origination and development of new mechanical ideas.

"I believe I see the true inwardness of the Emperor's unwavering naval policy. He does not want war; no one wants it less. But he apparently considers a large navy a good business investment. It insures protection to German capital invested in the remote parts of the world, as well as to German merchants wherever they may be. Hence their navy may be looked upon as a commercial proposition, and its cost as insurance premium. (Take in extra page X)

"I found my trip through Europe most interesting and instructive. It was made mostly by motor car, so we really saw the countries we went through, and really came in closer contact with the people who live in them than if we had travelled from place to place by train. I am well satisfied, however, to get back to my own country, for I did not see any country on the other side of the ocean that can compare with the United States, if considered as a whole.

X

"My visit to Berlin was exceedingly interesting. I had not been there for twenty-three years, and the city had grown almost beyond my recognition. It has been called the Chicago of Europe and it is certainly growing with Chicago speed. I have good reason to be interested in Berlin, for it is the center of electrical industry in Europe. The greatest of the electrical works, the Allgemeine Electricitäts Gesellschaft, is there, and is operated under the direction of my old friend Emil Rathenau, employing about 60,000 workmen. I feel a sort of paternal interest in this works as it was practically started by me, and once bore my name.

"Another of the great electrical works in Berlin is owned by another of my old friends, Sigmund Bergmann. He started his electrical life with me by working at the bench in my Newark shop about forty years ago, and later on made carbon transmitter telephones and phonographs, and afterwards became my partner in manufacturing the detail apparatus for the electric light system. His shrewdness and ability kept him ahead of the procession in this country, and he has kept up his reputation by organizing and operating his great establishment in Berlin, where he employs about 12,000 workmen and makes everything electrical.

"Still another of the great electrical shops is the one established by Schuckert, who also worked at the bench in my Newark shop with Bergmann, leaving my employ to go to Germany to settle up his father's estate. He stayed there and took up the manufacture of electrical apparatus and established the great works that bear his name, and in which many thousands of workmen are employed. He died immensely wealthy, but the works still go on.

"I was much impressed with the great progress Germany is making in electrical manufactures and in the use of electricity. The people use electric light with great liberality, for they can buy current very cheaply. I was told electric light is used so universally that they light their cow stables and pig sties with it, and electric current is applied to a vast number of purposes, even to grain fields for the propagation of nitrogen.

"I also visited the great shops of the Siemens-Halske and Siemens-Schuckert works. These cover a great large area and employ about 48,000 people and workmen. They not only manufacture not only everything that is used in the electric light and power fields, but also an immense variety of fine instruments and apparatus for philosophical and other purposes.

(Then take in last paragraph on page 12)

These are many important manufacturing plants that are the backbone of the electrical industry in Berlin. It is amazing to see the way in which they are so closely connected and interdependent upon each other.

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The people use electric light and power with great liberality, for they can buy current very cheaply. While there are many important manufacturing plants throughout the country, Berlin is distinctly the electrical center. The importance of the electrical industry to Berlin may be readily appreciated when it is realized that at least one-sixth of that city's population is directly or indirectly dependent upon it for support.

"I found my trip through Europe most interesting and instructive. It was made mostly by motor car, so we really saw the countries we went through, and really came in closer contact with the people who live in them than if we had travelled from place to place by train. I am well satisfied, however, to get back to my own country, for I did not see any country on the other side of the ocean that can compare with the United States, if considered as a whole.

**WILLIAM H. MEADOWCROFT PAPERS
REMINISCENCES ABOUT EDISON**

This folder contains reminiscences about Edison by his associates and employees. The reminiscences were collected by William H. Meadowcroft during the research for the biography, *Edison: His Life and Inventions*, by Frank L. Dyer and Thomas C. Martin. Some of the reminiscences are prefaced by explanatory or additional correspondence. The documents are arranged alphabetically by author: William S. Andrews, William G. Bee, Charles T. Hughes, Samuel Insull, Edward H. Johnson, Walter S. Mallory, and Francis R. Upton. The Andrews material includes several letters pertaining to a meeting of the Illuminating Engineering Society in 1907 at which Edison and his early electrical work were recalled, along with the transcribed minutes of that meeting. Reminiscences subsequently published by Edward G. Acheson and Francis Jehl have not been selected.

WILLIAM H. MEADOWCROFT PAPERS

**REMINISCENCES BY
WILLIAM S. ANDREWS**

Mr. W. S. Andrews. Mem

PERSONAL.

Schenectady, N. Y., April 4, 1898.

Mr. E. H. Mullin,
New York City.

Dear Mr. Mullin:-

I was pleased to receive yours of the 30th ult., and should be glad to exchange notes with you occasionally on topics of mutual interest.

Mr. Edison was in Sunbury, Pa., in July of 1883, for about a week or ten days supervising the starting up of the first three-wire Central Station for commercial electric lighting, and I then learned from him a great many of the terms relating to this business that have since become standard. The words "feeders", "mains" and "services" are, I believe, original with Mr. Edison as applied to an electrical system of conductors, although they may have had previous applications in the gas industry. He also originated the compound word "bus-bars", so named because all the feeders are connected to these bars; also many other terms which do not just now occur to me.

I went to work for Edison in 1879, and in the latter part of this year or the beginning of 1880, I helped to build the first low tension bipolar generator of his invention. I remember that he started with the idea that the armature should

be of very low resistance, contrary to the commonly accepted ideas at that time, and there was quite a spirited controversy in the Scientific American between Mr. Weston and Mr. Upton, who was one of Mr. Edison's assistants. If my recollections are right, Mr. Weston maintained that to get the highest economy, the resistance of armature should equal the resistance of the external circuit, in accordance with the prevailing practice in series battery work; whereas Mr. Upton argued on Mr. Edison's assertion that the resistance of the dynamo armature could not be too low, and the lower it was, the greater would be the efficiency of the machine. This incident goes to prove how thoroughly Mr. Edison had grasped one of the fundamental requirements of the shunt wound dynamo even at this early date.

We worked a great deal by guesswork, however, in those days. I think we wound the field magnet of our first dynamo with No. 10 wire, and then wondered why the field absorbed all the current that the armature could produce. Then we put a lot of external resistance in series with the field circuit, but that scheme cut down the magnetism too much. The fact then became apparent that the armature rule worked inversely in the case of the field magnet, and the resistance of the latter could not be too high, providing the magnetic field was strong enough. The field magnet was therefore rewound with smaller wire, and as the machine then gave better results, we tried still smaller winding, and so at last, after several trials, we secured fairly good results. All this work was

done without any rule or precedent to guide us, and I believe Mr. Edison aimed to get about 100 volts at the brushes.

Then all kinds of different incandescent lamps were made with filaments of card-board, wood, pressed plumbago and all sorts and conditions of carbonized vegetable matter. It was soon observed that when lamps burned too brightly their life was short, and when the carbon was too red the light was unsatisfactory. By and bye experts began to make lamps so that they lasted pretty well and still gave a fairly good light. It was then found that we were running our lamps at about 110 volts, and at this voltage the lamps as then made appeared to give the best average of light and life. 110 volts thus began to be recognized as a nominal standard for incandescent lamps, and after a time it became universal for Edison lamps. Subsequently we made 55 volt dynamos and lamps. The 110 volt machines and lamps were also for a time designated by the letter A. and the 55 volt machines and lamps by the letter B., but these designations were only temporary, and the 55 volt system was not extensively used in connection with Edison work.

We had a great time with that first dynamo! Edison was so interested in it that he would hardly take any sleep himself or let anybody else do so. I remember that I worked fifty-two hours without closing my eyes, and then went to bed and slept for about fifteen hours without opening them! Edison used to say that anybody should be able to work all night and the next day without feeling very tired. If one worked through

the second night, a slight "tired feeling" was pardonable, but any healthy man should be able to do it and also continue work through the third day; then take a good rest the third night, and wake up next morning all right again. I tried this once, but did not get rested for a week afterwards, so suppose I could not have been in the enjoyment of good health at that time! I really believe those old days at Menlo Park were the happiest in my life. The constant excitement, the appreciation of the fact that we were working on something entirely novel, the continual development of new ideas and the ever recurring query - What next,, - all combined to keep one in a perpetual thrill of expectation, and after all, to philosophize a little. I think there is generally more pleasure in anticipation than in fulfillment!

I could ramble on in this desultory manner almost indefinitely, but must change the subject lest I tax your time and patience too heavily.

Mr. Meadowcroft

NOTE: Written in pencil
This front page was so crumpled
and torn that I had to have it
re-typed verbatim. W.S.A.

(Written about 1907)

By W.S. Andrews

A SHORT ACCOUNT OF THE FIRST UNDERGROUND
SYSTEM USED FOR INCANDESCENT LAMPS.

In 1880, Mr. Edison laid out a system of underground distribution, covering a radius of more than half a mile from his laboratory at Menlo Park, to supply about 1000 lamps, placed on wooden lamp-posts along the streets and roads of the village of Menlo Park, and also in the dwellings.

As no electric lighting circuits had ever before been placed underground, there was absolutely no experience to guide in the proper laying and insulation of the conductors. Mr. Edison believed that the low pressure of 100 volts would not cause sufficient leakage to demand expensive insulation, so he ordered the bare copper conductors to be laid in the earth, in very shallow trenches, with no insulation except wooden molding, (such as is today used for interior lighting), with the usual covering board.

These conductors were composed of No. 10 B.W.G. copper wire. The large conductor was composed of twenty-five wires at the dynamo room, and it tapered at the end, (about half a mile distant), down to one No. 10 wire. The system was a simple, two conductor, multiple circuit, without feeders. Lamps were tapped from these conductors at the base of each pole, and in front of the dwelling to be lighted.

The complete system was laid and covered with about six inches of earth, before it was tested. The test consisted of turning on the current, with the result that the line was found to be practically short-circuited by excessive leakage throughout its entire length, as predicted by one or two of the old telegraphers employed by Mr. Edison as assistants.

An attempt was then made to insulate the system by pouring coal tar into the grooves of the molding. For this purpose the trenches were uncovered, the coverings removed from the molding, and a liberal dose of liquid coal tar served hot into the grooves where the wires lay. This time the test for insulation was taken before an attempt was made to start the system, and it showed that the insulation resistance was too low for practical purposes. Mr. Edison's chemist then discovered that the coal tar contained sufficient acid to destroy its insulating properties.

The next step was to experiment on one main. This experiment consisted of filling the grooves in the wooden moulding with a plastic composition made of powdered slate, and a binder which was discovered afterwards to be coal tar. This

insulation also failed for the same reason as in previous trials, namely, - acid in the coal tar; and another experiment was undertaken, which consisted in serving the conductors with marlin, closely wrapped on by means of revolving spools, similar to those used today for insulating wires, although on a different scale.

After this experiment had proved of insufficient utility, Mr. Edison confessed himself to be tired of haphazard trials, so he requested Mr. Wilson S. Howell to go into his library, and read up on the subject of insulation and insulating materials, such as resins, gums, oils, etc., and report to him in two weeks, with a list of promising insulating materials, which would be cheap enough to use on a large scale. When this report was placed in Mr. Edison's hands, he directed Mr. Howell to purchase what he thought proper of these various materials, with a supply of pots and kettles for making compounds, and installed him in his chemical laboratory, with orders to produce a cheap and effective insulating material.

He states that Dr. Otto A. Moses, who was Mr. Edison's chemist, was nearly driven to distraction by the stenches and smoke of the cooking of the various insulating compounds in his laboratory. The experiments were made on lengths of 100 feet of No. 10 copper wire, and when a promising compound was produced, this wire was served with the compound, held in place by muslin tape and after coiling into a tank of water, was tested for insulating properties, as long as the insulation would stand up.

After a few weeks of these experiments, the best of the insulating compounds was selected for use. This compound was composed of refined Trinidad asphaltum, mixed with oxidized linseed oil to give it the right consistency, and a little paraffine and beeswax were added to make the material smoother. Two or three tons of Trinidad asphaltum were bought, with a few barrels of linseed oil and litharge with which to oxidize the oil, several bales of cheap muslin, and some paraffine and beeswax.

Two 50 gallon iron kettles were mounted on brick work, and the compound mixed in these kettles. The muslin was torn into strips about 2-1/2 inches wide for the largest conductors, and passed through the compound while hot, and made into balls, to facilitate the winding of the conductors.

The conductors were again pulled up from the trenches, and lifted above the earth on short saw-horses. The method of winding was necessarily crude. A small boy straddled each conductor, walking out towards the end of the conductor, as he served the insulating tape carefully thereon. After he had proceeded ten feet or so from the home end of the conductor, a second boy was started out with a second ball of tape, and this one was again followed by a third boy; so that three servings of tape were put on each conductor, which was then laid back

into the trenches, the wooden molding having been removed. Each line was then tested, and the insulation was found to be remarkably good.

The first line completed was the one that led from the dynamo room past Mr. Edison's house, and along the Pennsylvania Railroad tracks.

It was on Election Day, 1880, that Mr. Howell informed Mr. Edison that this line was completed, the lamps in place, and everything ready for starting up. His answer was characteristic, "If Garfield is elected, light up that circuit. If not, do not light it."

Several of Mr. Edison's assistants gathered that evening with him in his Laboratory office to receive the returns. Mr. Edward H. Johnson was at the key, which was on a loop run from the telegraph line along the railroad tracks. Carefully was kept of the returns, and when the result seemed certain, Mr. Edison gave orders to light up the circuit, which ran for about a mile along the railway tracks. Steam had been kept up, and everything was in readiness to start the machinery, and turn the current into this circuit; so the row of bamboo filament lamps was started glowing on the night of Garfield's election, in November, 1880, - the first use of the incandescent lamp to celebrate the election of an American president.

This system of underground conductors maintained its insulation throughout that winter, and was in good working order when abandoned the next year, at the finish of Mr. Edison's celebrated demonstration of the efficiency of his incandescent lighting system, and the feasibility of operating underground electric lighting circuits.

The insulating compound prepared for this first underground system was used with practically no alternation, by the Edison Tube Works in the manufacture of the Edison Underground Tubing, and it is practically the same composition as that which is employed today for this purpose.

COPY

Wm. Meadowcroft.

Apr. 20, 1909.

W. S. Andrews, Esq.,
General Electric Co.,
Schenectady, N. Y.

My dear Mr. Andrews:-

For a year or more I have been endeavoring to get a copy of the Minutes of the discussion which took place after your historical paper was read at the meeting of the Illuminating Engineering Society. I finally succeeded, and have two or three copies after preserving what I need for the Board's library and my personal collection; also one for Mr. Clarke.

I dislike to put you to any trouble about it, but it seems to me that your impromptu remarks, between the paragraphs of your paper as originally read and printed, contained several statements which ought not to be lost and which were not taken by the stenographer. I recall, for example, some of your more or less facetious recollections regarding the way in which the railway conductors were laid down at Menlo Park in 1880; also I presume the conductors used for the illumination of a large area at that time. I think you will readily call to mind the points on which you thus enlarged in this second address. Very likely you made some memorandum of them on your notes which represented what you had said at the meeting of the Edison Illuminating Companies.

My suggestion is that your stories and contributions to history regarding the work done at Menlo Park might be briefly restated in a letter to me or to somebody else, a copy of which could be filed with the stenographer's notes of the discussion.

I think you will appreciate my anxiety to rescue the little

COPY

WSA--2

incidents and what now appear to us the unaccountable things which occurred at that time, before they disappear from your memory and that of others who are now able to tell the story. In Mr. Mendenhall's work on the life of Edison he is endeavoring, as I believe you understand, to embalm all such anecdotes and terse illustrations as will bring in the human side of Edison's investigations and discoveries. Quite likely you have contributed something to his stock of interesting reminiscences of this sort. If you have not, you ought to do so. I urged upon him the other day the great desirability of submitting to you and a few others who are available, the first draft of the chapter on Electric Lighting and Power Distribution. He said he fully intended to do so. The object of this reference to the matter is to make certain that you do not lose the opportunity of adding something to what he can get from others. I believe he intends to send the manuscript to me before a great while.

We are not seeing much of each other. I hope you will call whenever you can.

Yours very truly,

W. J. Jones

[ATTACHMENT]

Meeting of the New York section of the Illuminating Engineering Society held at the Engineering Building, New York City, Thursday evening, November 14, 1907.

Chairman Forstall called the meeting to order at 8:30 o'clock and said:

The meeting will please come to order. It gives me pleasure to see that the President of the Society is with us this evening, and I think you will join me in requesting him to preside over this meeting. Dr. Sharp, we will be very pleased to have you take the Chair.

Dr. Sharp took the Chair and said:

It gives me great pleasure to introduce to the New York Section of this Society one of the first and one of the most distinguished of the gentlemen who were connected in the early days and who are still connected with the electric lighting industry of this country. Before a distinctively electrical assemblage it would not be necessary for me to rise to introduce this gentleman to you, but since this society represents all kinds and methods of illumination, and all the sides of the art of illumination, and science of illumination, there is a certain appropriateness in my presenting to you this evening Mr. W. S. Andrews of Schenectady.

Mr. Andrews then delivered his address:

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President Sharp: Gentlemen, we have listened with very great pleasure to the remarks of Mr. Andrews, and I am sure that I am voicing the sentiments of every one present when I say that we are deeply indebted to him for coming down here and presenting this address to us. I hope that we next may hear from a number of those who were associated with Mr. Edison and with Mr. Andrews in this early pioneer work which has led up to the developments which we see at the present time. To introduce this discussion, I will take the liberty of asking one who has been identified with this work from the very start and who is still in a position to view the whole field of electric lighting and of the electrical industry in general, Mr. T. C. Martin:

Mr. T. C. Martin: Mr. President and Gentlemen: While I believe I can claim the honor and distinction of being the Oldest Edison man in the room, not by virtue of years, but by length of connection, that very same privilege unfortunately denied me the opportunity of being as closely connected with the introduction of the art of incandescent lighting as now I could wish; but it is impossible, I believe, to be connected in a pioneer capacity with every great art as it comes along. We do not make the selection for ourselves, Providence has a hand in it. My Work with Mr. Edison in connection with the phonograph and automatic telegraph, telephone and other inventions during the closing period of 1877, the year 1878, and the earlier period of 1879 had so far used up my youthful energies that I was very glad during

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Fall of 1879 to seek rest and recuperation in the West Indies, allowing my successors an opportunity to distinguish themselves in their field.

It was during 1879 that we began to hear the first whispers and murmurs of the coming tremendous development in incandescent lighting, of which we have had so admirable presentation tonight from my dear old friend Mr. Andrews, to whom my departure from the scene may perhaps have given a better opportunity than he otherwise would have enjoyed. I have been very much interested in traversing this history with him tonight and hearing him rehearse with such accuracy and yet with so much modesty the part which he himself has played in this great flourishing development of an art to which the world already owes so much. I was particularly interested to hear him give some statistics which I myself had the privilege of preparing for the U. S. Census Office, namely, that five years ago the development in incandescent lighting and arc lighting represented a capitalization in this country of \$586,000,000. That amount, today in the five years which have elapsed reaches closely upon \$1,000,000,000, and yet I could not help recalling, as he threw upon the screen tonight the picture of the steamship Columbia, the very interesting fact that the paper filament lamps which were placed in that installation were taken on board the steamer by my old friend Frank Upton in a market basket. Today, as I see the wagons of the New York Edison Company perambulating this City laden with lamps given away

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freely to some seventy thousand customers, I cannot help thinking of the tremendous and wonderful development which has taken place in the incandescent lighting field, which is represented by the total consumption in this country alone of 250,000,000 incandescent lamps up to date.

I think at this stage, Mr. Chairman, I may be permitted to leave to those who have actually taken part in the development of the art, to continue the story part of which I have endeavored during the last twenty-five years to record as a mere historian.

President Sharp: In Mr. Andrews' remarks he spoke of a certain direct connected unit, as we call it today, in which the engine made very extraordinary speed in revolutions per minute, and said that Mr. Clark could tell us something about that engine. I should like very much if Mr. Clark will favor us with some remarks on that engine and other things.

Mr. Charles L. Clarke: I remember distinctly the engine during the length of time it was in service. Charles T. Porter, an eminent designer of high speed stationary engines, undertook to make for Mr. Edison an engine of unusually high speed, much higher than he had before attempted, and entered into the work with all the well-known enthusiasm and ability characteristic of the man. The engine was, as Mr. Andrews has said, designed to develop about 100 h.p. at 600 revolutions; under the very high steam pressure for stationary engines of 120 lbs., 60 to 80 lbs being considered a high pressure at that time. Edison built the dynamo which was a very large one

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for that period, and adapted it for direct connection with the engine. Both engine and dynamo were mounted on a single heavy cast-iron bed plate, which was firmly bolted down on a large brick and cement foundation that nothing could move. In fact, it is there now; hoodlums and tramps have taken away almost everything else that was left in the establishment, but the foundation remains. I remember distinctly the night steam was first turned on to the engine -- Edison was there, Porter was there and John Kruesi, Edison's mechanical engineer, and in later years mechanical engineer of the General Electric Company, was also there, likewise Batchelor, Upton and other assistants of Edison, who afterwards eminently did their share in developing the art of incandescent electric lighting. Mr. Porter, of course, could not admit he was afraid of his own work, so he was willingly given the privilege of turning on the steam. In designing the engine he had naturally been obliged to depart from usual practice in so many respects that it was not to be supposed the governor could be adjusted beforehand to hold the engine at the desired speed; this was a matter for experiment. He kept opening the throttle and looking at the governor to see it rise. By and by it rose, but not until the engine was going with a vengeance, and the hair of most of those in the room was rising and the place was rapidly being evacuated. Nothing, however, would scare Edison; he remained, and also Porter and myself -- I was young and inexperienced, and simply did not know enough to be afraid -- I thought that was what a high speed engine should do -- go fast and make a

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big noise. It sounded like an immense drop-forge foundry, with ten thousand hammers in operation, that is about the best way I can express it. Porter said -- "Let us take the speed, Clarke." I replied "all right," and held the speed indicator, while Edison held the watch. The reading showed that the engine was making 750 revolutions, per minute. The link motion, within the limits of its movement, looked simply like a triangular shaped bit of haze or fog, and a newspaper could be read through the crank rod. Although the engine did not heat up, and the trial was a success in many respects, it was decided before the test of that evening was over that the speed was too high for safety, and the engine was condemned as far as its use for the purposes intended were concerned. Afterwards the engine was operated for a short time at 350 revolutions per minute, in order to experiment with the dynamo to determine its electrical characteristics. But the idea of operating engines at such a high speed as 600 revolutions per minute was dropped, and larger engines of the same power, at 350 revolutions, were adopted, at the Pearl Street station and elsewhere, as mentioned by Mr. Andrews.

Chas. L. Clarke.

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President Sharp: Mr. Andrews has referred to another gentleman who was prominently connected with the installation of the first New York station, and who also was the first to carry the Edison system to the Italian Peninsula. This gentleman is still lighting New York by electricity, and has favored us with his presence this evening. I hope we may hear from Mr. Lieb.

Mr. John W. Lieb, Jr.: Mr. Chairman and Gentlemen:

I am sure these pictures which Mr. Andrews has presented and his interesting remarks have called to the minds of many of us interesting experiences passed many years ago in the pioneer days of the industry.

In some of the developments of the early days in connection with the commercial applications of the electric lighting systems we did not profit by experience along similar lines that was available and in starting up some of the stations they were operated without any ammeters or voltmeters, although such instruments of more or less practicable types were available.

One of the most remarkable things in connection with the whole development of the industry is the fact that so many features which have become recognized as essential parts of all commercial lighting systems had been well thought out by Mr. Edison, so that when his system was finally perfected there was available a complete and practical system including the engines,

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dynamos, regulators, underground system, wiring, safety devices, meters, switches, sockets and the lamp itself.

President Sharp: We have the pleasure of having with us tonight a gentleman from the other side of the water who has already made himself heard for a moment regarding the "Jumbo" which was installed in the Holburn Viaduct Station in the early days. I wish that we may hear from Mr. Stewart.

Mr. W. N. Stewart: Mr. President and Gentlemen: I thank you for the invitation to participate in this discussion. This is the first time in my twenty-six years that I have been privileged to gather with a lot of old Edison men, and it gives me great pleasure to be here on this occasion. I left Goerick street in 1881, the proud possessor of one of these d jumbos which Mr. Andrews has shown us, and a vast fund of inexperience, which would fill several books. I made an exhibition of the jumbo in the theatre in Santiago, Chili, and on the first evening when the theatre was filled with the aristocracy of the town, I discovered to my horror the binding wire around the armature was slowly stripping off and going to pieces. We had no means of boring out the field magnets, and we cut grooves in it. I think the machine is still running. The result of the exhibition was the establishment of a central station in the following year, 1882, which consisted of eight K dynamos.

I have followed the careers of the old Edison men with pleasure and interest, and rejoiced in their successes and

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the reputations they have made, but I, too, can claim a reputation in this business. I claim the reputation of having installed and operated the worst Edison central station ever known in the history of the business. I am not proud of that reputation, but I think no one can challenge the fact. With these eight K. dynamos we had four belts between each engine and the dynamo. The steam pressure was limited to 75 pounds per square inch. We had two-wire underground feeders, sent without any plans or specifications for their installation; the station never had an ammeter or voltmeter, the station pressure was registered by a galvanometer; we were using coal costing \$12. a ton, and we were paid for our light in currency worth fifty cents on the dollar. The only thing that I can be proud of in connection with the plant is the fact that I did not design it, and once in a while we made out to pay its operating expenses, and occasionally we could run it for three months without a total breakdown.

Since then you have seen great improvements, everything has advanced, and I want to say to the young men here tonight, that while perhaps they think they have not the opportunities the older men had in the beginning of the business, I want to show them that the chances are today greater for success. We had to do our work by main strength and awkwardness -- there was no skilled attention -- no attendants, no science about the business, everything new and untried; we did not have the mental equipment, the training which the young men have today,

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and therefore I say keep on with the improvements.

Yesterday we thought the reciprocating engine was the end of all things, today we use the steam turbine, and tomorrow we may have the gas turbine. There is always room at the top for young men, but one thing will not improve, and that is the magnificent esprit de corps and spirit of fraternity that existed among the old Edison men. I never knew one of them afraid to turn his hands to any work, no matter how dirty, or who failed to assist a brother in distress or give him the benefit of any knowledge; and I hope the young men will perpetuate that spirit. As I go to my distant home in a few days, I shall remember my visit here tonight with great pleasure and I wish you all God Speed.

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President Sharp: In connection with some of the early work done in illuminating engineering with the incandescent lamp, when it was really in its infancy, I think we should be interested in listening to what we may hear from Mr. Howell.

Mr. Wilson S. Howell: Mr. President and Gentlemen:

In looking back at the old stations that had no means of regulation, no indicators, no voltmeters or ammeters, it is wonderful to think that the Edison lamp was so very good as it was. It did not get the credit for it. The stations were run at all kinds of pressures and with all kinds of results from the lamps. Some records of life were very high and some records were very low. I remember complaints that used to come in from the station managers to the Edison Lamp Works when I was a station manager in those days, that the lamps were rotten, no good, and at one meeting of the Edison Association, away back, the manager of one of the largest stations in Pennsylvania -- Philadelphia was not started then -- got on his feet and condemned the Edison lamp as rotten, he said it would not live 200 hours, and the tirade against the Edison lamp amused me very much. I do not know what possessed me to do it, but I winked at this gentleman, and that encouraged him to believe that I had some experience of a similar character in the little station in New Jersey which I was operating at that time, and before leaving the floor he said that he knew that Wilson Howell would back up

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what he said about the rottenness of the Edison lamp. Well, I could not. I acknowledged when I got on my feet that I had not had the same results, that my experience with the Edison lamp in New Brunswick, N. J., had been quite the opposite, but that I had paid extreme care to my regulation and that I had secured considerably over 3000 hours average life for my lamps. I had no sooner taken my seat than our worthy Pennsylvania friend jumped to his feet and said that it was easy to account for the rottenness of the lamps in his town and the excellence of the lamps in my town. He said: Gentlemen, the man who runs the New Brunswick station has a brother in the Lamp Works. Mr. Edison was at the meeting and interested in the account which I gave of getting such a long, satisfactory life from the carbon lamp, and before I left the meeting he asked if I would not tell him how I got it. I told him that I regulated the pressure very carefully, and that I was at that time running ten candle power lamps at 16 candle power, and getting an average of over 1,000 hours from those lamps. He asked me if I would take 100 lamps which he would specially prepare for me, and make a life test of the lamps. He made a lot of fine lamps, as fine as we had in those days, and I ran them day and night at 16 candle power and got over 600 hours average life out of these lamps and that was the first try out of the so-called new type high efficiency Edison lamps of 3.1 w.p.o.

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President Sharp: We have with us tonight one of the early Edison men who has distinguished himself in many electrical fields, perhaps more so in others than the lighting field, but whom we shall be glad to hear from tonight. I refer to Mr. Sprague.

Mr. Frank J. Sprague: I have not much to say, but I am glad to add a few words of Thomas A. Edison, a man whose name is emblazoned in the records of fame above that of all other great inventors. Twenty-nine years is perhaps a long span in any man's life, but it is a little more than that when, somewhat ambitious as an inventor, I wrote from the Naval Academy to Mr. Edison on some matters relating to telephony. I received a courteous letter from him saying he would be glad to see me at his laboratory on my way home. I remember my first interview with him. It was marked with the same cordiality, but good horse sense, which every man who has come in contact with Mr. Edison has always found. He pointed out the defects in my plan, but seeing my hesitation said: - If you do not think so, go to my laboratory and try it. Going inside the walls of the laboratory, I was attracted by the atmosphere of the place, and soon put aside my particular scheme. Shortly afterwards I left for a trip around the world, but the electric germ had gotten into my head, and I could not get rid of it. The low marks which I later received from my superior officers may be charged to my interest in

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electrical subjects.

In the spring of 1880, I was ordered to the Minnesota, a training ship with 350 boys on board, but I had no relish for "training the young idea how to shoot." While roaming around the ship I discovered a single cylinder fly wheel feed pump. I wrote to Mr. Edison in effect -- "Can I borrow one of the Z dynamos? I would like to make an attempt to introduce electric light into the U. S. Naval Service. I have a feed pump with a fly wheel which I will use as an engine, and I think I can make the dynamo run." Edison's horse sense was manifested by his reply, declining to allow the use of the machine, and explaining that the resultant irregularity will damn the light, and a year or two later it was my pleasure to secure orders for the Sydenham Electric Exhibition. I landed in London with \$20 in my pocket and many debts on my shoulders, but pending pay arrangements, managed to get ^{money} enough to pay my board. I reported to the august body known as the Jury of that exhibition, containing men like
S Horace Darwin, Fleming Jenkin, Prof. Chas. Adams and Capt. (7)
de Abney, all wise looking and able, and I was young. I announced that the only section of the Jury on which I would act was that dealing with electric lighting, and electric motors if there were such. They looked me over, sized me up and concluded to put the work on me. I was made Secretary of the Section, and with Prof. Adams and Horace Darwin organized

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a series of tests for every lamp and dynamo in that exhibition. It was at that exhibition that the first large installation Mr. Andrews spoke of tonight was made, and I became so imbued with the importance of Edison's work, and the future of electrical development that I embraced the opportunity of becoming well acquainted with Mr. E. H. Johnson, Mr. Edison's representative at that time, and on his recommendation I made up my mind to resign from the Naval service. I resigned sooner than Johnson expected, and he had me on his hands. Meanwhile, he had called upon me to make a report of the three-wire system, known in England as the Hopkinson system, both Dr. John Hopkinson and Mr. Edison being independent inventors at practically the same time. I reported on that, left London, and landed in New York on the day of the opening of the Brooklyn Bridge, in 1883, and with a year's leave of absence.

I reported at the office of Mr. Edison on Fifth Avenue, and told Mr. Edison I had seen Johnson. He looked me over and said--"What did he promise you?" "\$2500 a year" I replied. He did not say much, but looked it. About that time Mr. Andrews and I came together. On the 2d of July of that year we were ordered to Sunbury, and to be ready to start the station on the 4th. The electrical work had to be done in forty-eight hours. Having traveled around the world, I had cultivated an indifference to any special difficulties of

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that kind. Mr. Andrews and I worked in collaboration until the night of the 3d. I think he was, perhaps, more appreciative of the discipline of what at that time was known as the Edison Construction Department, but more familiarly known afterward as the destruction department, than I was; and one of the old Edison men, Mr. Samuel Ineull, once Mr. Edison's secretary, was manager of the organization. Mr. Andrews thought it would be well for us to wait until the morning of the 4th before we started up. I said that we were sent over to get going, and insisted on starting up on the night of the 3d. We had an Armington & Sims engine with eight-feed oiler. I had never seen one, and did not know how it worked, with the result that we soon burned up the babbitt in the bearings, and spent a good portion of the night getting them put in order. The next day, Mr. Edison, Mr. Ineull and the Chief Engineer of the Construction Department appeared on the scene, and wanted to know what had happened. They found an engine somewhat loose in the bearings, and there followed some remarks which would not appear well in print. Andrews skipped from under, he obeyed orders, and I did not. But the plant ran, and it was the first three-wire station started in this country.

Mr. Andrews spoke of the jumbo plant on the Holborn Viaduct, installed under direction of Mr. Hammer. That was

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perhaps the first place where a large electric motor, driven from a machine of like character, was operated by accident. The two machines were running one night, and after the usual falling off in the demand for current, an order was given to the engineer to shut down one engine. He did not think it wise to pull a switch with the current on, so he began to screw down the valve, but the engine kept on running. After a while he had the throttle entirely closed, but the engine was still going. Then we suddenly discovered the fact that the machine was taking current from the other machine, and was running as a motor - driving the engine.

The Brookton station was the first three-wire underground station. I was sent there in charge. In the meantime, I had not been in as great favor with the Construction Department as might have been desirable. A few months had passed, I had drawn my salary, but I was wondering if I would last out. My relations with the Manager were not entirely harmonious. At that time the activities of the Construction Department were somewhat limited by the methods of finding out how to plan a station. Brother Clark remembers how that was done. There was a table on which were laid out mains and feeders, and resistances representing groups of lamps according to the report made by the canvassers. If I remember rightly, the lay-out was founded on the idea of mains of the same size and feeders of the same resistance. This

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method took a week or more and Mr. Edison concluded there should be some more abbreviated system. He had no mathematical training, but, as I have said, plenty of common sense. He said - "I want a shorter plan devised". Johnson saw me and said - "Why don't you try it? You had your training at Annapolis and can certainly do it" I said - "All right, I will try it." I went to work and developed a mathematical system which Edison would not accept till proved out. His methods were often very practical. A story is told that two of his assistants were once instructed to calculate the cubical contents of a lamp and that they did so with very much mathematics. The results disagreed, and he said: "Both cannot be right, try it again." They tried it the second time and agreed more closely. He promptly checked them by filling a lamp bulb with water and weighing. I duly presented my plan to him, and he said he thought he would see how it agreed with a careful physical lay-out. My solution finally proved to be between the two, and was adopted as the successful method. I was sent to Brockton with a new feather in my hat, to take charge of the station electrical work, except that pertaining to meters, which was given to another man, and for some time used to make all distribution plans in a few hours.

Well, those were somewhat anxious days, but the Edison business kept growing, and about 1884, at the end of one year's service, Mr. Edison one day asked me to take up the subject of the transmission of power. I wrote him a very glowing epistle, putting into it my best efforts, and told him I must decline to take up the field of power except in my own way; in fact, I was

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ambitious to make a name in that field, if I could. A reply soon came, a brief typewritten communication something like this: "Sprague: Inasmuch as the Construction Department is about to be given up, I think the best plan for you will be to resign. Edison." That was sufficiently curt and short, but I am very glad I got it, because immediately afterward I took up the subject of the development of the transmission of power and railway work, with what results it would be out of place tonight to detail.

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President Sharp: It gives me great pleasure to call on Prof. Marks, especially as the Professor is next on my list.

Prof. Marks: I did not come here expecting to say a word. When I learned that the pioneer, Mr. Andrews, whom I have always esteemed, was going to tell me about the things that happened in the long, long ago, I wanted to come and hear him. I really cannot say very much to add to the interest of the subject myself. I began, you might say, under the personal instruction of Edison, in 1887, to build the first 10,000 h.p. station that was ever attempted. A vast amount of discussion resulted from the fact that we proposed to put in a 1,000 ampere dynamo and run it at 125 volts. We got it in finally, and it always run right. The station itself, as you perhaps know, was the first one run to the then enormous height of 120 feet, and it was to have some 10,000 h.p. of engines, and some 14,000 h.p. in boilers. At that time it was considered wonderful, nothing like it ever heard of before. I kept always turning, however, during disputes, to the common sense of Edison, who was willing to discuss any trouble that came up. We had a good many financial difficulties too. I am not going to tell you more about the engineering -- we have had that fully discussed, but we had a good many financial troubles concerning which it was not proper then to speak. There was a banker in Philadelphia who took the matter up and who undertook to raise a million dollars, but he failed before the money was raised, and it turned out after that, that the Edison royalty was thirty-five per cent of that million -- think of it, gentlemen, \$350,000, and finally they

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compromised on \$300,000 in stock and \$35,000 in cash. Afterward we found we would have to have some \$60,000 more. I did not know why, and it was only later that I found out that the Philadelphia politicians had to be taken care of before we could start the station. It resulted that \$400,000 had to be spent at the start and \$600,000 was left in my hands as engineer with which to build a 10,000 h.p. station, with all the necessary distribution and net-work of conductors. We struggled along with that \$600,000 for two years, and finally we got to going. Then followed two years of service as engineer, during which at times I did not know whether or no I was going to have money enough to pay for the men at the end of the month. We always went behind, and finally I turned to Mr. Edison again and told him something must be done. We had^{had} four presidents, and no end of change in the Board of Directors, and trouble and death in the station with it all. One thing we always stuck to and that was that the lamps should be 1-1/2 or possibly 1-1/4 cent per lamp hour, but the people would not have it. Edison again came to my rescue. And we put the lamp hour at 3/4 cent, which was the first time in the history of electricity that the price of electricity was put at 15 cents per kilowatt hour as the highest rate. I devoted myself to finding out just what it did cost to run the station. I was digging day after day and hour after hour into every bit of data, and it dawned on me finally, in the year 1890 or 1891 that if you can get anything hooked on that will run from ten to five hours you can sell electricity for five cents to 7.5 cents per kilowatt hour, and if you can get it to run a little longer, at less than 5 cents

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per kilowatt hour, and then that system was inaugurated. By that time, (end of 1891) this Edison Company had accumulated a floating indebtedness of \$180,000 and debenture indebtedness of \$300,000, but from that moment on, (and I owe it to the assistance of Thomas A. Edison, because all my own arguments would have had very little effect) but from the moment we inaugurated a scale of 15 cents per kilowatt hour and discounts according to the length of use down as low as 5 cents per kilowatt hour, the prosperity of the station began to be apparent, and in four years we succeeded in paying off our debts and an average dividend of 13 per cent per annum. In this fact you have only another illustration of Edison's horse sense and far seeing wisdom.

Mr. J. D. Flack: I do not know that I can exactly be called one of the pioneers. My connection with Mr. Edison dates from the year 1887 at the Edison Lamp Works at Harrison New Jersey. Those were the days of the old wooden box voltmeter and indicator such as at that time were used in the earlier stations. It was my duty to look after the calibration of these instruments together with the photometric testing of incandescent lamps. The Edison System at this time was well developed so that I can not recall any of the earlier troubles and difficulties.

I do recall an exhibition of Mr. Edison's horse sense, as it is called. Mr. Edison's laboratory, at the time I speak of was located at the Lamp Works and it was his custom to

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have his experimental lamps sent to the photometer department for test. These lamps after test were returned to him together with tabulated sheets showing candle power, economies, etc. When error occurred in these tabulations, as they sometimes did, Mr. Edison would upon an inspection of the sheets immediately point these errors without any apparent calculation whatsoever, running over the tabulations rapidly with his finger checking off the results in error as fast as he came to them, saying as he struck each out "you have made a mistake, try this one over". I know of no case where we made our test a second time that we did not find that we were wrong and Mr. Edison was right. The errors were detected as quickly as he saw the figures and could place his finger upon them. The quickness with which this was done did not permit of even the ordinary mental calculation and the fact that he was never wrong exhibits the remarkable action of his brain. This is especially interesting when it ~~xxx~~ is known what a limited knowledge Mr. Edison had at this time of arithmetic.

President Sharp: I wish next to call on a member who is also Secretary of the American Institute of Electrical Engineers, Mr. Ralph W. Pope.

Mr. Ralph W. Pope: Mr. Chairman and Gentlemen: I suppose I might be considered today a pioneer possibly in the electric field, it is just going on fifty years since I took up telegraphy in the winter of 1858. It was not my fortune to be connected with the development of electric lighting, and

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What I know about it is what I have seen from the outside, but of course I have watched its development from the very earliest times. I had the good fortune to be associated with Mr. Edison to a considerable extent at the time he was developing the printing telegraph. You may remember that one of his first and most important patents was what was known as the Pope & Edison printer, my brother, the late Franklin L. Pope, being associated with Mr. Edison in that work.

The first electric lighting that I knew of was shown experimentally by the late Dr. Ogden Doremus in the early 70's. It was simply an arc lamp operated by quite a large number of gallon cells of carbon battery. The object he had in view in making the demonstration was to bring about the use of an arc lamp for light house purposes. Then followed the inventions of Mr. Edison developed at Menlo Park. About the same time Mr. Brush came into the field with an arc lamp which made quite a display and electric lighting interests profited very largely by the advertising of the incandescent lamp through the stories of the incandescent lamp in the New York newspapers. This, of course, was about 1878, 1879 or 1880. This development of electric lighting was a most happy circumstance for steamship work, and we have heard tonight of the early installation on the Steamship Columbia, which proved the suitability of the electric light for marine purposes, so that today I do not suppose any other light is ever considered where steam is used on board of a ship.

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I think it should be stated that the old Pearl Street station in New York City was on Pearl Street, No. 257, I think a few doors from Fulton Street.

President Sharp: Are there any other gentlemen present who desire to take part in this discussion?

President Sharp: We would be very pleased to hear from Mr. Jenks on the question which is before the meeting.

Mr. W. J. Jenks: Mr. President and gentlemen: The lecture of Mr. Andrews, and the reminiscences which it has called out, carry me back nearly twenty-five years, to the time when, about the 1st of August, 1883, Mr. Sprague came to Brockton to put in the electrical work of that first three-wire underground station, of which I was to be Manager. Mr. Sprague's work at that time had been generally outlined. Three "H" dynamos had been provided, as Mr. Andrews showed you in the photograph of the interior of the Brockton station. One of them ran from a 35 h.p. Armington & Sims engine, 350 revolutions per minute; the other two were operated by a 125 h.p. engine, 185 revolutions per minute. The scheme was that when the load dropped off to small proportions after 10 O'clock, we should, by proper switches, cut one of the outside ~~wires~~ blue wires (this was before the days of bars) of the three-wire system and instantly join it to the other, so as to have two outgoing and one returning wire, thus relieving one dynamo on the large engine, throwing the load upon the other at single voltage, then switching to the single generator and small engine. We did it until we

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found that during ~~that~~ light load we reversed half of our meters and the station owed several customers for current; then we stopped. We were using the Edison Chemical meter then, and the way you connected it with the circuit made the radical difference between an income and an expense account.

I have a very vivid recollection of one night, not long after the big conductors from the dynamos to the switch-board were very carefully taped, asphalted and put under the floor by Mr. Sprague. There was no cellar, and these dynamo wires were run straight down beside the base frames, laid in grooves cut in the floor timbers and came up on the side of the room. We had started the station Oct. 1, 1883 with great pomp and amid popular acclaim. After having staid with us a week Mr. Edison had gone home and we had a locomotive engineer who was not supposed to be afraid of anything, to run the engine and dynamos. All of a sudden one quiet evening there came a grand flash and noise and some fire through the floor; the fireman hid behind the boiler, the engineer jumped out of the window, and Mr. Sprague turned the juice off and stopped the engine. For a time these things happened right along.

The Brockton station was the birthplace of the Sprague motor. Although it was for some years a show-plant, illustrative of the best practice in the use of the three-wire system, the time it afforded Mr. Sprague for embodying his ideas in his first crude motors, resulted in a degree of progress which entitles this pioneer station to the greater distinction of being

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the starting point from which have spread the ever-widening uses of the Sprague methods and apparatus. The little office of the station had a tapestry carpet and a lounge. For some weeks during Mr. Sprague's watchcare of the system's operation, the carpet was littered with armature cores, magnet wire of varied coverings and colors, jack knives, asphaltum varnish, japan and shellac bottles, paper insulation, magneto testing bells, and other interesting and important materials and devices. Most of these were stored under the lounge during the hours of extreme mental activity following the receipt from New York of blue-prints of new cities and towns to which Mr. Sprague has alluded, charted to show existing lighting, and waiting to learn, by Mr. Sprague's mathematical methods, the size and cost of electric conductors for so-called "village-plant" three-wire installations. It was generally understood by the station employees that the most satisfactory results were secured when these charts and Mr. Sprague were spread at length on the office carpet, and the overflow accessories of wires, bells and asphaltum were kicked into the corner. Thus the three-wire system prospered while its engineering department was located in Brockton.

If our friend Mr. H. Ward Leonard were here he could tell interesting stories of his work at Brockton as Mr. Edison's meter expert. The first locally employed meter man was a boy named Kimball, who was disposed to spend more of his time in revelling in new electrical problems than in weighing the plates of chemical meters. I happened to find ~~xxx~~ to-day an autograph

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letter written by Mr. Edison to Mr. Andrews Jan. 2, 1884, three months after the Brockton station started, and containing suggestions for later stations. I will read a few sentences:

" I think the wages for men at stations should be as follows: Engineer, \$65 per month daylight to daylight running, starting, of course, one-half hour before required in evening. They do their own firing up to 1600 lights, after that a fireman allowed. The meter man should be called manager, salary \$50 a month. Duties taking meters, collecting, keeping books and running electrical part from one-half hour before dusk until 75 pct. of load goes off. I should not take too young a man for this, say man from 23 to 30 years old, bright and businesslike. Don't want any one who yearns to enter a laboratory and experiments. We have a bad case of that at Brockton; he neglects business to potter. What we want is a good lamp average and no unprofitable customers. You should have these men on probation and subject to passing an examination by me. This will wake them up. Also I think it very essential that for several days the steam should be raised in the morning and if there is a spare at station they should be practiced. (both Eng. and Manager) on switching, using bank of lamps. We have found that the Brockton men were not sufficiently practical, hence if anything goes wrong they lose their heads."

There are many things that come to the minds of old-timers here which would be of great interest to all of you. Reminiscences like these may be made valuable as well as entertaining, and someone should undertake the task of gathering them

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while the promoters and early managers remain to tell their stories. Of the Brockton plant constructors, John Kreusi, who placed the underground conductor system, has gone, but the rest are available. Mr. Andrews deserves our cordial thanks for his effort to revive these recollections, and another evening might well be devoted to a further address along similar lines.

WILLIAM H. MEADOWCROFT PAPERS

**REMINISCENCES BY
WILLIAM G. BEE**

Anecdote showing Edison's tenacious memory,
related by Billie Bee.

"One day Col. Bailey, of Amesbury, Mass., who was visiting the Auto Show in New York, came out to the Laboratory to see Mr. Edison, who had expressed a desire to talk with him on his next visit to the metropolis. When he arrived at the laboratory, Mr. Edison was asleep on the cot in the library. I had entertained Col. Bailey for about three quarters of an hour, when he said he had only a very short time to stay as he desired to take a certain train for home. As a rule, we never awake Mr. Edison from sleep, but as he wanted to see Col. Bailey, I felt it was up to me to do so this time, and I went and tapped him on the shoulder. He awoke at once, smiling, and jumped up and, as usual, was instantly himself and advanced and greeted the visitor. His first question, after the greetings were over, was 'Well, Colonel, how did you come out on that experiment', referring to some suggestions he had made at their last meeting a year before. For a minute Colonel Bailey did not recall what was referred to, but a few words from Mr. Edison brought it back to his remembrance, and he reported that the results had justified Mr. Edison's suggestions."

Billie Bee says that when they were working at Silver Lake, day and night, and were all tired out, he has

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seen Mr. Edison get into a roll-top desk, curl up like a kitten and go to sleep instantly. And he always wakes up good natured and smiling, and always the live-wide-awake Edison, instantly in full possession of his senses.

April 15/09.

WILLIAM H. MEADOWCROFT PAPERS

**REMINISCENCES BY
CHARLES T. HUGHES**

Legal Box 60

STATEMENT OF CHARGES T. HUGHES MADE JUNE
19, 1907.

I went to work with Mr. Edison at Menlo Park, on October 21, 1879. He was then a very handsome man, 33 years of age with very dark brown hair, much lighter in weight than at present, probably about 170 lbs. He was a man of great force and of the same dominating personality as at present. His practice was to receive the heads of his departments almost every day and lay out their work for them. He was a very hard worker; he did not have any regular hours; I have known him to spend forty-eight hours at a time at the Laboratory without going to the house, which was only about 1000 feet away, and without taking off his clothes. His principal place to rest was under the stairs in the laboratory on some old paper which had been thrown in there merely as rubbish, but he would go in there to sleep. He sometimes slept an hour or two; it depended on what he was working on. The men worked day and night when they had to. His wife lived at Menlo Park. There were from 60 to 70 men employed. We had a machine shop, a single story building, about 120 by 50, and the laboratory was a two-story building about 150 by 50, and there were small buildings around, one little place being used as a lamp factory and containing about six mercury pumps. At that time, the principal work was on the incandescent lamp. Charles Batchelor was Edison's first assistant and the principal man next to him. John Kraus was the foreman in the Machine Shop. Charles Dean was the principal mechanic and machinist, and Francis R. Upton was the

mathematician. Considerable work was being done on the motograph telephone. Little or nothing was being done on the phonograph or telegraph, but a little work was being done on the autographic telegraph. Each experimenter was distinguished from the machinist in charge of his own particular department. The day I arrived the first pair of incandescent lamps with paper filaments were being exhausted by the mercury pump. Edison had not then begun to use bamboo, but bamboo was settled upon after I went to the laboratory. Edison sent a man named Moore to look for fibres of different kinds, and Moore would send them back to him and he would try them, and finally, after trying a great many different kinds, it was decided that bamboo was the best. I do not remember Edison sending Professor James Rioulton of Maplewood, N.J. on this work. After the two lamps which I first saw, were made, Edison began to make paper lamps in not very large quantities, and it was one of my duties to look up the different kinds of paper. I obtained samples of the commercial paper of different kinds, especially white papers. I finally arranged to have the Crane Paper Company make up a special paper for him. The first lighting plant at Menlo Park employed four dynamos in multiple, which were constructed at the Laboratory. Great difficulty was experienced in regulating them at first. As soon as Edison found that he had perfected the lamp commercially, he began to prepare for practical demonstration by installing a number of small dynamos and running circuits through the village of Menlo Park, and as his idea was to install the first incandescent station in New York City and he knew that the system would have to be placed underground, he put his system of conductors underground at Menlo Park. Of course it was a very

crude affair as compared with the system later adopted in New York, but it answered the purpose very well. I should say this was early in 1880, but perhaps was as late as the summer ~~xx~~ of that year. Sometime after that J.P. Morgan sent a number of Swedish naval officers out to see Edison's system. He had as a result of a number of weeks' work, a dozen or so of incandescent paper lamps and put them in an old show case, letting them rest on cotton so as not to be injured and when these lamps were connected in circuit they went out immediately, evidently because of the loss of vacuum. Edison asked me if I had any more of them and I told him that I had, and took the remaining lamps and put some resistance in the circuit so as not to give them the full voltage and gradually cut off the resistance, so that the lamps were brought up to a bright red, and when I noticed the blue flame in the bulb where the carbons join the leading in wires, Edison admitted that it would be a good thing to get those fellows out of the place. It was not so much a question of the hours of burning, as of preserving the vacuum for a long time. Scientific men had all been telling Edison that it was an utter impossibility to retain a vacuum in glass, and I thought that they knew what they were talking about and that Edison did not. Edison tried a lot of different kinds of glass until he finally found what the constitution of the glass should be to offer the greatest resistance to the entrance of air. Edison did not seem to be all discouraged at this failure. I told him when he came back that it was too bad and that it was mighty discouraging, but he said it was nothing and that he knew just what was the matter. As I recall it, he told me that the place that the air came in was at the joint where the lamp was sealed off at the top, and I think that

the way he got around it was to put an extra seal or seal an extra piece of glass over the top that was likely to crack. This was done right away. There was no trouble with the ~~exhaustion~~ ^{operation} of the lamps, but the trouble developed only when the lamps were kept for a long time out of use. In 1879 the paper lamp had been perfected, and he was satisfied that it was a commercial article. My work at first was with the motograph. The chalks were very irregular and we had a lot of trouble and Edison always use to say that anything, no matter how useful it might be, would never be successful commercially, unless it was of such a character that a fool could operate it. One of the difficulties with this was keeping the chalk spool damp, and as the percentage of moisture changed, the efficiency of the telephone varied with it, so as to give a great deal of trouble. When the spool was kept very wet, it did not work well, but if kept just right it worked first-class. I made hundreds of experiments and tried all kinds of materials and all kinds of solutions. Another difficulty was the chalk spool had to revolve while you were receiving a message and if it did not there was nothing but a jumble of noises. The first thing we did was to have a little arrangement of putting your finger in for revolving the chalk spool and then we had clock work to revolve it, but then we found in actual practice that people would not only forget to wind the clock, but would actually fail to push the button to revolve the motor, and the result was that the telephone was not effective at all. I experimented on this work about a year and stopped because it was pretty well determined by Edison that it would never be a success. It was a very loud talking instrument, louder than the present phonograph, and although no horn was used, there was no trouble at all in hearing 100 feet away from the receiver.

During this time experiments on the electric lamp were still going on. Commercial arrangements were made to take up the lamp about 1880. Capitalists from New York, including J. P. Morgan and his friends went down to Menlo Park to see the exhibit and agreed to put it in. I knew of the installation of the first plant at Pearl Street, but had nothing to do with it. The apparatus for that plant was built at Goerok Street.

In the latter part of the year 1880, I took up the development of the electric railway. Before I went with Edison I had been a railroad man and when I first heard of the scheme I became very much interested and enthusiastic about it. One of my own books relating to this work is attached hereto. ^{Two} roads were built, the first road was about $\frac{1}{2}$ mile long and ran from the shop at Menlo Park down the hill and around a curve forming the letter U. It was a single track road with rather light rails - - second-hand street car rails. The current was supplied through the rails so that all of them had to be insulated from the tires. We used for this purpose tar, asphalt, canvass paper and things of that sort. I should say the first road was built in the summer of 1880 and was operated early in the year 1881. The motor was capable of developing from 20 to 25 H.P. and the current was supplied from the lighting plant. On this road we were able to get as high as forty miles an hour. The first road was not considered a good demonstration and we decided to build another one about three miles long. It ran from the point where the original road ended (the latter being torn up) and extended through the town in almost a direct line to a place called - dark Lane. At the beginning of the road we built a small house for the locomotive. The road was

the standard 4' 8 $\frac{1}{2}$ " gauge. The locomotive shown in the picture is the second locomotive, used with the second road and which was built in 1861 or 1862. For the first road, the locomotive was an ordinary flat dump car about 6 ft. long and 6 ft. wide, with an dynamo at one side and bolted to the axle. For the second road we at one or two trailers and a passenger car, and also a freight car. We carried a lot of passengers on the second road, and sometimes ran all day long. Edison took a very great interest in this work and frequently road back and forth over the line and sometimes operated the locomotive himself. One day Henry Villard sent down a man named Henderson, who was the chief engineer of the Northern Pacific Railroad Company to look into the electric railroad project. Edison and Henderson and I started out on the locomotive and Edison ran it. Just beyond the engine shed there was a trestle 60 or 70 feet deep with a considerable down grade and Edison put on all the power when we were going over this trestle, so that we must have been running at least 40 miles an hour. The engine weighed six tons and we were running on sand-
hand street car rails weighing only 16 lbs. to the foot, and when we got ~~down~~^{over} the trestle and started down the track I saw the perspiration coming out over Henderson's face. As soon as we slowed up a little, Henderson said -
"when we go back I will walk ^{and} if there is going to be any more of that kind of running I won't be in it". Villard was interested in the railroad scheme, because it is one of Edison's pet ideas to operate electric railroads in the wheat regions of the country as feeders for the great transcontinental line. We operated the road for a couple of years and then tore up the tracks, since Mr. Morgan said that he did see anything in it and refused to put up

any more money. Edison spent all the money he had afterwards to demonstrate its feasibility, and I remember that when we were still experimenting, Mr. Insull came to me and asked me to try and get Edison to give it up, because he could not get any more money. Insull at that time was Edison's private secretary. When the road was torn up, practically the whole force had been moved to New York to construct the first Edison lighting plant, and of course the interest in Menlo Park gradually dwindled until it was closed down entirely. I do not think Edison intended to frighten Henderson on the trip I spoke of, but he simply wanted to see what the locomotive would do. However, I noticed that Edison seemed rather pleased when he found that Henderson was so soured.

I ^{did} not go to New York with Edison, but left him when the electric railroad enterprise was given up. I had to look for a job somewhere and took an agency for the Edison Electric Light Company and tried to organize local companies and sell apparatus. I did organize the first underground system outside of New York city in the town of Newburgh. I told Edison I could get \$60,000. for a 1600 10 c.p. lamp plant, which was no more a miracle than anything he had ever done. I saw more or less of Edison during the time these difficulties with the ore milling scheme and in fact, bought a good deal of stock in the ore milling Company and in the Concentrating Works. He never talked with me about his troubles. He is and always has been the most cheerful man under discouragements and difficulties that I ever saw. In fact, he did not seem to know when he was up against a stone wall, and if it were not for that particular qualification he would not be where he is today. When those Swedish naval officers came ~~for~~

with Mr. Morgan and we showed them the incandescent lamp, and the lamps gave out, I thought that my place would be out in the fields with the hoe and I would not have given 15 cents for the entire incandescent lamp system. But it did not seem to bother him in the least. Edison has told me many times that he never became interested in anything until difficulties were encountered. He has always told me that he never care to do what anybody could do. For a man whom is so completely wrapped up in his work, he is wonderfully generous and wonderfully unselfish - - too much so in fact, since people try to impose upon him. He seemed to rarely become angered and was more likely to become angered at some trifling ^{thing} than at a large ~~xxx~~ thing.

Regarding the autographic telephone, quite an extensive experiment was being carried on with it when I entered the laboratory. I did some work in this line with Mr. Patrick Kenney, who had charge of the experiment. He also built a model of the magnetic iron ore concentrating apparatus, but he had nothing in the way of crushing or grinding devices. His idea had been simply to treat black sand containing iron in considerable quantities, which is found in certain parts of the country and which would not require crushing. I recall the first Mrs. Edison very well. She was a very nice woman, ~~xxxxxx~~ bright and vivacious, beautiful in appearance and character, and was very much devoted to him. There were three children at the time, Tom, Will and Marion. This was about the year 1883 and 1884 - Tom and Marion were called Dot and Dash, but Willie had no nick-name. Dot grew to be a very nice girl - she was about ten years old at this time.

I way I happened to meet Edison was that I had been superintendent of a Telephone Company in Albany and a friend of mine who was one of the principal owners of that concern heard that Edison wanted somebody to exploit his motograph telephone in Chili, and I thought that this might be an opportunity for me, so he gave me a letter of introduction to Edison. His name was H.H. Eldridge. When I came with Edison I have been for a number of years a railroad conductor, and had picked up quite a number of stories during my experiences, but I found that Edison was just as full of stories and we use to frequently exchange experiences with one another. He had a better memory than any man I had ever seen and if he heard anything he never forgot it. No matter how busy he was he never seemed at loss for an appropriate anecdote. At that time Edison smoked a good deal and very seldom drank anything. He was not a teetotaler, but chewed tobacco. He seemed to spend very little time at his meals, ate very little and very rapidly. About two or three years ago I came in the laboratory and it seemed to be one of the days that he did not have very much work to do, and after we had talked for an hour or more, he suddenly said: "By George, I have forgotten my lunch". The lunch had evidently been waiting for him for a long time, because the sandwiches were so dried up that they curled over at the edges. At Menlo Park, he had his lunch at the laboratory; sometimes he would eat with Batchelor or some of the other heads of the departments, and lunch would be sent down from the house. There was a time during the incandescent lamp experiments that they served supper at midnight and he ate with the other men who happened to be doing night work. Edison worked sometimes all night, and

frequently we would lose him and find him under the stairs asleep on the pile of newspapers. Almost always during the experimenting on the incandescent lamp, Edison worked until two or three o'clock in the morning. There were two or three boarding houses near the laboratory at Sam Menlo Park, but most of the men lived at Newark Rahway, and Elizabeth. Batchelor was also a very hard working man and contributed much to the success of the incandescent lamp. I think he was an watchmaker originally, and a very fine mechanic with plenty of horse sense, and seemed never to tire or weaken. I recall that at one time Edison got some Italian hemp, which was very fine, a great deal finer than human hair, and filaments thereof were carbonized and put into the platinum clamp ready to be inserted in the lamp. Batchelor was carrying two or three of these hemp filaments in a box from the laboratory across the yard to the room where the lamps should be exhausted, and although he had worked two or three hours to get them ready, owing to their fineness and delicacy, when he got to the room he found that they were lost, apparently having blown away. Without saying a word, he started back and made up some more. It was this faculty that made him so helpful to Edison. But what I have seen of Edison it has always seemed to me that the secret of his success was based upon his good health, his physical strength combined with the faculty of enormous energy and does not know what monotony means. He gave me the idea once of his own impression of his success. The first Mrs. Edison asked me one morning when I was going into the City to get them a box at the Charity Ball, and Mrs. Dr. Gurnsey being President of the affair, I saw her and told her what I wanted. I said that Mr. Edison had come in on the same

train with me that morning and I did not think he was going home again and he had a brown check suit of clothes on but I could not tell whether he had a neck tie or not. Just as we got to that point, Dr. Gurnsey came in and his wife, said to him - "Dr. will we let Mr. Edison come to our ball with a brown check suit of clothes on tonight?". Dr. Gurnsey, with a good deal of said: "That man's god-like genius will take him anywhere". I was telling Edison later what Dr. Gurnsey said, and with a good deal of disgust, said: "God-like nothing", "sticking to it is the genius". And he certainly knows how to do that.

Regarding the storage battery, I have had an Edison battery in my car for about four years and have used it for three years every day, at least three hours, running ruin or shine. About four or five months ago, I noticed the voltage did not seem to keep up and I took it to the factory to have it looked over and it was found that about three of the cells were a little out in some way, and these were fixed up. At that exception, the battery is exactly as good today as when I put it in. I have not given the battery any attention myself and have depended entirely upon a comparatively ignorant colored man, who has had entire charge of it. I have had absolutely no trouble whatever with the battery. For about eight months I was under the impression that the battery had to be filled with distilled water every three weeks until I later learned that this ought to be done once a week, but even this neglect seemed to make no impression on the results. With my machine I can make about 12 miles an hour, and I have frequently been out four hours and running all the time. Without doubt, I can make fifty miles easily on a level today.

WILLIAM H. MEADOWCROFT PAPERS

**REMINISCENCES BY
SAMUEL INSULL**

EDISON BUILDING,
129 ADAMS ST. CHICAGO, ILL.
CABLE ADDRESS: "THE BULL, CHICAGO."

Chicago, Feb. 10, 1909.

T. C. Martin, Esq.,
Care Electrical World,
239 West 39th St., New York City.

Dear Mr. Martin:

I have your favor of the 8th. I send you enclosed herewith shorthand writer's notes of what I dictated in answer to your questions. I have not had an opportunity to read this statement, so I send it to you subject to correction later on. The only subject . . . which I have not dealt with is the question of the consolidation of the Thomson-Houston and the Edison General Electric Companies. I do not know whether or not I want to dictate a memorandum on this subject. There are many reasons why I should like to put my narrative of the negotiations on paper; on the other hand there are many reasons why I should not, as in dealing with the facts, I might hurt the feelings of some people still active in the electric manufacturing business. As to whether I shall dictate anything on this subject, I will decide after having seen you next week.

I am rather expecting to stay at Delmonico's, Fifth Avenue and 44th Street this trip, and in all probability I shall reach New York on Tuesday. If I get an opportunity, I shall telephone you and try and make an engagement with you.

In sending you the enclosed memorandum, I want it understood

EDISON BUILDING,
25 ADAMS ST. CHICAGO, ILL.
CABLE ADDRESS "INTELL, CHICAGO"

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that this memorandum is my property, but you are welcome to make use of anything in it in connection with the biography of Edison which you are now engaged on. The reason I mention this is, that it is the first time I ever dictated anything with reference to my relations with Edison's business, and it may be that some time or another I may want to use the enclosed in connection with something that I might want to publish myself.

Yours truly

Samuel Insull

[ENCLOSURE]

Mr. Insull's Notes - Feb., 1909

1. Do you recall any details of Edison when you first met him?
2. Do you recall anything about the impression he made on you?
3. A personal sketch of him at that time, brief, would be interesting - I mean how he looked and spoke, his method of work.

I can best answer the three above questions as one.

I first met Edison on March 1st, 1881. I arrived in New York on the S.S. "City of Chester". I landed, I should judge, about five or six o'clock in the evening. I went direct to 65 Fifth Avenue. I had come over to act as Edison's private secretary, the position having been obtained through the good offices of Mr. Edward H. Johnson, whom I had known in London, and who wrote to Mr. U.H. Painter of Washington, about me in the fall of 1880. Mr. Painter sent the letter on to Mr. Batchelor, who turned it over to Edison. Johnson returned to America late in the fall of 1880 and on the 16th or 17th of January 1881, cabled me to come to this country. I left Liverpool on the S.S. "City of Chester" on the 17th of February, 1881, and arrived in New York late in the afternoon of the first of March. At the time Johnson cabled for me Edison was still at Menlo Park but when I arrived in New York the offices of the Edison Electric Light Company had been opened at 65 Fifth Avenue and Edison had

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moved into New York with the idea of assisting in the exploitation of the Edison Electric Light Company business. I was taken by Johnson direct from the Imman steamship pier to 65 Fifth Avenue and met Edison for the first time. There were three rooms on the ground floor of 65 Fifth Avenue at that time. The front room was used as a kind of reception room, the room immediately behind it was used as the office of the president of the Edison Electric Light Company and Major E.B. Eaton was the president. The back room, which was directly back of the front entrance hall, was Edison's office and it was in this room that I first saw Edison. There was very little in the room at the time except a couple of walnut roller top desks, which were very generally used in American offices at that time. Edison received me with great cordiality. I think possibly he was a little disappointed at my being so young a man; I had only just turned twenty-one and had a very boyish appearance. The picture of Edison as I first saw him is as vivid to me now, although it is within a few days of twenty-eight years since our first meeting, as if it had occurred yesterday. I had been connected with Edison's affairs in England, as private secretary to his London agent, for about two years, and had been taught by Johnson to look upon Edison as the greatest electrical inventor of the day (a view of Edison which, by the bye, has been strengthened as the years have rolled by), and now owing to this and the fact that I felt highly flattered at the appointment as his private secretary, I was

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naturally prepared to accept him as a hero. With my strict English ideas as to the class of clothes to be worn by a prominent man, there was nothing in Edison's dress to impress me. He wore a rather seedy black diagonal Prince Albert coat and waistcoat, with trousers of a dark material and a white silk handkerchief around his neck, tied in a careless knot falling over the stiff bosom of a white shirt somewhat the worse for wear. A large wideawake, soft hat, of the then generally used in this country sombrero pattern. A rough brown overcoat, cut somewhat similar to his Prince Albert coat, his hair worn quite long and hanging carelessly over his fine forehead. His face was at that time, as it is now, clean shaven. He was full in face and figure, although by no means as stout as he has grown in recent years. What struck me above everything else was the wonderful intelligence and magnetism of his expression and the extreme brightness of his eyes. He was far more modest than in my youthful picture I expected to find a man of such distinction. After a short conversation Johnson hurried me off to meet his family and later on in the evening, probably about eight o'clock, Johnson and I returned to Edison's office and I found myself launched without further ceremony into Edison's business affairs. Johnson had already explained to me that he was sailing the next morning, March 2nd, on the S.S. "Arizona", and that Edison wanted to spend the evening discussing matters in connection with his European affairs. It was assumed, inasmuch as I had just arrived from London, that I would be able to give more or less informa-

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tion on this subject. As Johnson was to sail the next morning at five o'clock, Edison explained to me that it would be necessary for him to have an understanding of European matters from him, and he, Edison, started out by drawing from his desk a check book and stating how much money he had in the bank and he wanted to know what European telephone securities were most salable, as he wanted to raise the necessary funds to put the incandescent lamp factory, the Electric Tube Works, and the necessary shops to build dynamos on their feet. The coincidence of my arriving one evening and Johnson leaving the next morning resulted in this, my first evening spent with Edison, being devoted to a discussion of his financial affairs. All through the interview I was tremendously impressed with Edison's wonderful resourcefulness and grasp and his immediate appreciation of any suggestion of consequence bearing on the subject under discussion. His appearance was not what you would call "slovenly"; I think it is best expressed by the word "careless". He spoke with very great enthusiasm of the work he had before him, viz., the development of his electric lighting system, and his one idea seemed to be to raise all the money he possibly could, with the object of pouring it into the manufacturing side of the electric lighting business, and I remember how wonderfully impressed I was with him on this account, as I had just come from a circle of people in London who not only questioned the possibility of the success of Edison's invention, but often expressed doubt as to whether the work he had done could be called an invention.

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at all. After discussing affairs with Johnson (who was receiving his final instructions from Edison) far into the night and going down to the steamer to see Johnson aboard, I had finished my first night's business with Edison at somewhere between four and five in the morning, feeling thoroughly imbued with the idea that I had met one of the great master minds of the world. You must, of course, allow for my youthful enthusiasm, but you must also bear in mind Edison's peculiar gift of magnetism, which has enabled him during his career to attach so many men to him. I fell a victim to the spell at the first interview. It is a great pleasure to me to recall my feelings of that night, feelings which are just as strong today as then.

4. Can you sketch the environment, which would help for a picture of early Menlo Park?

The next morning, Tuesday, I went with Edison to a conference with Mr. John Roach, the ship-builder, and at that conference Edison agreed to take the old Astma Iron Works, the works where Mr. John Roach laid the basis of his fortune, but which at that time were not used and which were situated on Goerok Street, west of Grand Street on the East side, and in these works were established the first Edison dynamo manufacturing establishment, known as the Edison Machine Works. That same Tuesday night I paid my first visit to Menlo Park with

[ENCLOSURE]

Edison. Up to that time I had seen very little of the incandescent lighting. Johnson had a few lamps in London, lighted from primary batteries. In the summer of 1880 Swan had a few series lamps burning in London. When I arrived in New York there was a small gas engine plant just being started at 65 Fifth Avenue, but I had never seen an electric lighting central station system until I had visited Menlo Park. My recollection is that I arrived at Menlo Park and went to Edison's house for supper, and when walking from the Menlo Park station to the Edison residence, about a block east of the depot, I saw for the first time a number of buildings lighted by incandescent lights. After supper we went up to Edison's library and office. It was situated in a brick building on a little higher ground than his residence. Upstairs was his well equipped technical library, which formed also his office, and from that time on, whenever I was in Menlo Park, my office. The ground office of the brick building was occupied by the technical staff attached to Edison's laboratory. Back of this laboratory and facing the building, was a two-story wooden building in which were situated his chemical laboratory and experimental rooms and back of this wooden building was another brick building containing the machine shop attached to the first laboratory, and also his boiler plant. There were probably a dozen different buildings, including the houses of Edison, Batchelor, Kruesi and Upton, and a small lamp factory about one-third of a mile away on the south side of the Pennsylvania railroad track. The houses were all lighted with

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incandescent lamps. There were a few motors operating and the current was distributed by means of underground conductors imbedded in asphaltum and surrounded by a wooden box. The system employed was naturally the two-wire system, as at that time the three-wire system had not been thought of. The lamps used were partly of the old fibre horse-shoe filament paper carbon lamps and partly bamboo carbon filament lamps and were of an efficiency of from 95 to 100 watts. I can never forget the impression that this first view of the electric lighting industry produced upon me. Menlo Park was naturally the Mecca of those who looked upon Edison as the great inventive hero of the time. It must always be looked upon as the birthplace of the electric light and power industry. At that time it was the only place where could be seen an electric light and power multiple arc distribution system, the operation of which seemed then to my youthful mind as successful as the operation of one of the large metropolitan systems of today. I can never forget this, my first visit to Menlo Park. I well remember about ten o'clock that night going down to the Menlo Park depot and getting the station agent, who was also the telegraph operator, to send some cables for me to my London friends, announcing that I had seen Edison's incandescent lighting system in actual operation, that so far as I could tell it was an accomplished fact; and I also well remember that a few weeks afterwards I received a letter from one of my London friends, who was a "doubting Thomas", upbraiding me for

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so soon coming under the spell of the "Yankee inventor".

5. Can you outline your duties? That would give some of the routine, such as it was, at that active time.

6. Did Edison dictate answers to correspondence, etc.? Did he marginalize memorandums of documents, etc.? Something about his characteristics of this kind.

I do not think that I had any understanding with Edison when I first went with him as to my duties. I did whatever he told me to do and looked after all kinds of affairs, from buying his clothes to financing his business, I used to open all the correspondence and answer it all, sometimes signing Edison's name with my initial and sometimes signing my own name. If the latter course was pursued and I was addressing a stranger I would sign as Edison's private secretary. I held this power of attorney and signed his checks; it was seldom that Edison signed a letter or check at that time. If he wanted personally to send a communication to anybody, if it was one of his close business associates, it would probably be a pencil memorandum signed "Edison". I was a shorthand writer and seldom took down from Edison's dictation, unless it was on some technical subject which I did not understand. I opened all correspondence and would go over it with Edison, sometimes making a marginal note in shorthand and sometimes Edison would make his own notes on letters and I would be expected to clean up the correspondence.

[ENCLOSURE]

with Edison's laconic notes a guide as to the character of answer to make. It was a very common thing for Edison to write the word "yes" or "no" "E" and this would be all I would have on which to base my answer. I was naturally a very early riser and as a result of a training in an English business establishment, I kept regular business hours. The first few months I was with Edison he was most of the time in the office at 65 Fifth Avenue; then there was a great deal of trouble with the life of the lamps there and he disappeared from the office and spent his time largely at Menlo Park and I spent a large portion of my time between 65 Fifth Avenue and the financial district (Wall Street) and Menlo Park. At another time there was a great deal of trouble with some of the details of construction of dynamos and Edison spent a great deal of time on Goerok Street, which had been very rapidly equipped with the idea of turning out bi-polar machines of the vertical type direct-connected machines, the first one of which went to the Paris Exposition and the next six being installed in the old Pearl Street station of the Edison Electric Illuminating Company of New York, which was situated on Pearl street just south of Fulton street on the west side of the street. Edison devoted a great deal of his time to the engineering work in connection with the laying out of the first incandescent electric lighting system

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in New York, in a district bounded by Fulton street on the north, Nassau street on the west, Wall street on the south and Pearl street or one or two blocks further east on the east. Apparently at that time (this was between the end of 1881 and spring of 1882) the most serious work was the manufacture and installation of underground conductors in this territory. These conductors were manufactured by the Electric Tube Company, which Edison controlled, at a shop at 65 Washington street, which was run by John Kruesi. You will remember the half round coppers which were used. These were kept in place first of all by a heavy piece of cardboard and later on by a rope and then put in a twenty-foot iron pipe and a combination made of asphaltum and linseed oil was forced into the pipe. I remember as a coincidence that the building at 65 Washington street was only twenty feet wide. These lengths of conductors were twenty feet, six inches long, as the half round coppers extended three inches beyond the drag ends of the twenty foot lengths of pipe, and in one of the operations we used to have to take the length of tubing out of the window in order to turn it around. I was elected secretary of the Electric Tube Company and was expected to look after its finances, and it was in this position that my long intimacy with John Kruesi first started. In those days John Kruesi's English was a little more broken than it was in the years that followed, and I remember at one of my early interviews

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with him he told me at lunch one day that he wished as a favor that I would return all his letters to him, first correcting the English, as his knowledge of business correspondence was limited, and he would like to have the benefit of my corrections of any letters which he might address to me.

You ask me whether Edison marginalized documents. He did this very extensively. Edison had a wonderful ability in pointing out the weak points of an agreement or a balance sheet, all the while protesting that he was no lawyer or accountant, and his views were expressed in very few words but in a characteristic and emphatic manner.

7. Do you recall much of Edison's affairs -- financial? My own impression at the time was that he spent all that came in. During 1878-9 I had a good deal to do in New York at the Phonograph office, 203 Broadway, and later in Reade street, as much waiting for the royalties as caring for the apparatus. The bookkeeping seemed really to be done in Charlie Cheever's office. I have some of his own statements as to the Newark period.

8. In other words, did you not have to systematize Edison's business life?

9. Do you recall the fate of any of the earlier companies and inventions? There was the old Phonograph Company, a Carbon Novelty Company and two or three others. I used the electric pen frequently in 1878-9 but have never learned when it dropped out of manufacture. It was useful.

[ENCLOSURE]

early
In those days I had little or nothing to do with the phonograph business, it was absolutely dead. Johnson was the only man who seemed to take any interest in the phonograph. He had one of the old types of machine with tin-foil and used to experiment on it a good deal. Edison's only apparent interest in the phonograph at this time would probably be summed up on the remark which he made to me one day: "Well, Sammy, they never will try to steal the phonograph; it is not of any commercial value and therefore nobody will ever have the incentive to try to get it away from me." This remark may seem odd in these days, when one of the large businesses of the country is that of manufacturing talking machines and the records which are used on them. I had nothing whatever to do with Edison's affairs at Newark. You must remember that he moved to Menlo Park about the time he started his electric lighting experiments. I never had anything to do with the Carbon Novelty Company. At the time I came to this country the electric pen was manufactured I think by the Western Electric Company and was used a little in New York, I had seen it used more in London. There was a duplicating business operating in London by Thomas Butler who was my predecessor as private secretary to Col. Gouraud, Edison's representative in London. At a later date Butler gave this up and came to America and acted as my private secretary.

[ENCLOSURE]

I never attempted to systematize Edison's business life. Edison's whole method of work would upset the system of any business office. He was just as likely to be at work in his laboratory at midnight as midday. He cared not for the hours of the day or the days of the week. If he was exhausted he might more likely be asleep in the middle of the day than in the middle of the night, as most of his best work in the way of inventions was done at night. I used to run his office on as close business methods as my experience admitted, and I would get at him whenever it suited his convenience. Sometimes he would not go over his mail for days at a time, but other times he would go regularly to his office in the morning. At other times my engagements used to be with him to go over his affairs at Menlo Park at night, if I was occupied on business in New York during the day. In fact, as a matter of convenience I used to more often get at him at night than in the day time, as it left my days free for me to transact his affairs and enabled me probably to a midnight luncheon to get a few minutes of his time to look over his correspondence and get his directions as to what I should do in some particular negotiation or matter of finance. This arrangement might result in my visiting him at Menlo Park or at Goerck Street in in Bergmann's shop, or when ever the necessities of the moment compelled him to give attention to experimental work. I think it rather grew to be a habit for him to transact my business with me at night time.

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If for any particular reason he was spending his time regularly at the office at 65 Fifth Avenue during the day he made a practice, and consequently so did I, of spending the evening there as well. While it was a matter of suiting Edison's convenience as to when I should transact business with him, it also suited my own ideas, as it enabled me after getting through with my business with him to enjoy the privileges of watching him at his work and to learn something about the technical side of the business. Whatever knowledge I may have of the electric light and power industry, I feel I owe it to the tuition of Edison. He was about the most willing tutor, and I am afraid I must confess that he had to be a very patient one.

To go back to your eighth question: I never tried to systematize Edison's business life, it would have been impossible, but I tried as far as I could to ~~xxx~~ systematize his business.

10. Can you summarize a few reminiscences of work on the incandescent lamp?"

At the time I came to this country, March 1881, the incandescent lamp took from 95 to 100 watts. Edison had just begun to receive bamboo from Japan. At that time he was hunting for some other material. It was some years later when the filaments were made chemically. In 1881 and 1882

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Edison was intent on finding a vegetable fibre. He wanted something that would make up a higher resistance filament than the bamboo which he was able to get. He sent M.F. Moore back to Japan to see if he could get a higher grade of bamboo - that is, finer fibre- something which when carbonized would have a higher resistance. He sent Frank McGovern to hunt through South America for some kind of vegetable fibre, and Edison ransacked the vegetable kingdom of the world to get something that would cut down the current consumption. I do not remember the date when we got to seven tenths of an ampere consumption in the 16-candle-power lamp. I think we dropped from .94 to about .8 and then to .7, and it was years afterwards that the fifty watt lamp came out. You will have to get this kind of information from the lamp people. I probably will refer again to the incandescent lamp subject in my reference to the Edison Lamp Works.

11. Do you recall much of the early electric railway work? There is a tradition of your driving the old locomotive up to such a high speed that it jumped the track.

(Below is a copy of letter from T.O. Martin to Samuel Insull of November 20, 1908).

"With regard to our recent correspondence and the list I sent you of questions touching upon question number 11, but not clearly brought out there, I have been making some inquiries lately as to what became of the old Electric Railway Company of America, and there seems to be a good deal of vagueness and indefiniteness about the whole affair. I fancy you must have known a good deal about this as Mr. Edison's representative,

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and can, perhaps, say whether my deduction is right, viz., that it must have passed into the hands, in one way or another, of the General Electric Company. It looked at one time as though this might be a large and formidable concern, but I can discover absolutely no trace of its actual passing out of existence. I had a memorandum with regard to the subject but overlooked it in preparing the series of questions for you."

When I arrived from England Edison had an electric railway in operation in Menlo Park, or rather, he had operated it in the summer of 1880. I arrived on the first of March 1881 and visited Menlo Park on the second of March, 1881. It must have been the following Sunday that I spent at Edison's house at Menlo Park and received my introduction to the electric railway. Nothing was running. The electric locomotive was in a small wooden building. The tradition about my driving the old locomotive up to such high speed that it jumped the track is untrue. Edison had one piece of track running on the level back of his laboratory and then he had another piece of track running down into a gulley or ravine, and, boy-like, I was playing on a handcar just at the head of the ravine and the handcar got beyond my control and dashed to the bottom, and was later on turned over to the junk man. That is the basis of the tradition that I drove the old locomotive at such high speed that it jumped the track. The fact is that the handcar jumped the track, the old locomotive was standing still in its shed and was not turning a wheel.

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With relation to the questions asked in your letter of the 20th of November, Major Eaton can tell you all about the Electric Railway Company of America. The company was partly owned by the Edison Electric Light Company and partly by Thomas A. Edison and partly by Stephen D. Field. It languished. The Edison Electric Light people did not believe in the electric railway and did not want to spend any money on it. Edison was very anxious to go ahead with his electric railway experimenting, and, probably in 1882, he got Mr. Henry Villard to put up the necessary money for experiments. I think Mr. Villard put up somewhere between \$15,000 and \$20,000. Edison turned the experimental work over to Charles T. Hughes. The locomotive which Charles T. Hughes built is, I believe, owned by the Pratt Institute of Brooklyn. The Association of Edison Illuminating Companies borrowed it for the St. Louis Exposition. There are a few photographs of the old original electric locomotive still around. One, I remember, shows Charles Batchelor, Francis Gepl and wife, John Kruesi on it, and several others. This locomotive was broken up, so far as my recollection serves me, although as to this I am not absolutely sure. Edison probably knows.

The experiments which Charles T. Hughes had charge of and for which Villard paid, were run by Edison personally and the money Villard advanced was as a personal loan to Edison and was ultimately paid back to Villard by Edison. Later on

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Stephen D. Field's interest in the Electric Railway Company of America was bought, I believe, by the Edison Electric Company, and if my memory serves me rightly, the Edison Electric Light Company went out of existence at the time the Edison General Electric Company was formed. I think Edison's advances for railway experiments (which should have been paid by the Electric Railway Company of America) were reimbursed to him by the Edison Electric Light Company sometime prior to the formation of the Edison General Electric Company. Major Eaton knows a good deal about this matter.

12. Anything about the various shops in New York or old "65" Fifth avenue - reminiscences of places, men and conditions.

13. Do you recall much about the removal to Orange and the creation of the new laboratory?

14. Would like something of the creation of Sohenestady. I told the technical story for you in the paper many years ago, but what I mean are the general inside events and facts. It meant considerable investment and was a long way from Orange.

15. Would like something as to starting the old Harrison Lamp Works, and why "Harrison"?

I think this is probably a good place to give you a general idea of the various companies formed for the manufacture of the apparatus used in the developing of the

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Edison electric lighting system and also of the various business organizations in connection with the development of the business. You should bear in mind that the Edison Electric Light Company was formed for the purpose of supplying Edison with funds for carrying on his experiments in connection with the development of an electric lighting system. His first great work was the invention of the high resistance incandescent lamp. At the same time that he was at work there were others^{at work} on incandescent lamps; Swan in England and Foxham in this country. But they were all working on the idea that what was necessary was a low resistance lamp and these lamps should be run in series. Edison ~~was~~ very early came to the conclusion that a series system was no system at all, that the proper thing to do was to develop a multiple arc system and he soon found that in order to run a multiple arc system successfully he would have to have a high resistance lamp. You will recall that his patent on the lamp is for a flexible filament of carbon of high resistance enclosed in a hermetically sealed glass globe from which the air has been exhausted. His early patents and feeders and distribution system show what a far-seeing engineering genius he is; and as you well know it is impossible to operate any commercial system except a series arc system without following the broad engineering ideas contained in Edison's early system patents. Edison

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was an enthusiast on the proposition. The gentleman who formed the Edison Electric Light Company, viz., Grosvenor P. Lowry of the firm of Porter, Lowry, Soren & Stone, was an enthusiast and his enthusiasm was shared by the early directors of the Edison Electric Light Company. As a result it was perfectly natural that as Edison's scheme of electric lighting system developed to a success the Edison Electric Light Company considered that they had the most valuable patent rights ever granted; and if you can get access to the early minute books of the Edison Electric Light Company you will find on their records a resolution, which I believe was proposed by Mr. Tracy Edison, one of their directors, to the effect that it was impolitic for the company to jeopardize its valuable patent rights by entering upon the manufacturing side of the business. This happened before I came to America. In the early days Edison had the idea that in addition to the protection of patents the manufacture of the lamp would probably be further protected by trade secrets, and he, with the cordial support of the board of the Edison Electric Light Company (who did not, as above stated, want to go into the manufacturing business anyway), worked out a scheme to form a company to manufacture lamps. This company was called the Edison Lamp Company. I think it was probably late in the autumn of 1880 that this company was formed. I remember Johnson writing

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me about it from Menlo Park after he had closed his relations with the telephone business in London, and it was in August, 1880, that Johnson left England. That is how I fix the date of the formation of the Edison Lamp Company--late in the autumn of 1880. Edison's scheme was to form a company of one hundred shares, each share being \$2500., and as I recall it, no stock being transferable except on the personal permission of Thomas A. Edison. Edison had a controlling interest, Batchelor had a ten per cent interest; I think Upton had ten per cent and I think Johnson had five per cent. This company had a shop at Menlo Park on the south side of the Pennsylvania railroad track, probably a quarter or one third of a mile east of the Menlo Park depot. The factory was later abandoned for the Harrison factory, to which I will refer elsewhere. Before lamps were made on a commercial basis the entire capital of the lamp company was wiped out, but ultimately restored from the profits of the business, and on account of the excessive prices charged gained a great reputation later on as a money making institution. Prior to my coming to America, in March 1881, another company had been formed with a capital of \$25,000, which company was to manufacture underground conductors known as electric tube. The company was called the Electric Tube Company. Edison was president, John Kruess was treasurer and general manager and soon after my arrival in this country I was made the secretary. I believe I ultimately

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became secretary and treasurer, but I am not quite sure as to this. This company was owned one fifth by Edison, one-fifth by Krussi, one fifth by Batchelor and the other two fifths were owned by E.P. Fabbri and Mr. J. Hood Wright, who were partners of Mr. J.P. Morgan in the firm of Drexel, Morgan & Company. My recollection is that subsequently Edison bought out Mr. Fabbri's interest. On March 2nd, the morning after I arrived in this country, Edison, as I have already stated, took a lease of the Goerck street works and there was established the Edison Machine Works. The original money for this purpose was supplied ninety per cent by Edison and ten per cent by Batchelor. Edison had hoped to have associated with him in this matter some of his Wall street friends, notably those connected with the firm of Drexel, Morgan & Company, and possibly Mr. Henry Villard; but Mr. Edison, fortunately for himself and unfortunately for his friends, visited Wall street to get them interested in his machine works at a time when financial affairs were a little unsettled, and growing impatient at his financial friends for delaying a decision on the matter, he decided to finance the Edison Machine Works himself. This part of my story is from hearsay, as no interview with relation to interesting other parties in the Edison Machine Works took place after I came to this country. The capital for the Edison Machine Works was provided ninety per cent by Edison and 10 per cent by Batchelor. The concern did an extremely good

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business for the first year or two of its existence and then languished for some time. Its subsequent development I will refer to later on. At the time the Edison Machine Works was formed Siegmund Bergmann was carrying on an electrical manufacturing business, making telephonic and telegraphic instruments and doing some experimental work in electric lighting sundries, such as switches, sockets, etc. His shop was on Wooster street. His only partner, so far as I know, at that time, was Edward H. Johnson. In 1881 Mr. Bergmann conceived the idea of purchasing the factory at the northwest corner of Avenue B and 17th street and asked Mr. Edison to join him in partnership. The assets of Bergmann & Company were valued and Edison put into the business an amount equal to one-half of the then value of the assets and the company was put into a corporation, Edison owning one third of the stock, Bergmann one third and Johnson one third; and Bergmann & Company, partly with the inventive skill of ~~Bergmann~~ Edison, partly that of Johnson and partly that of Bergmann, developed all the miscellaneous articles required in connection with house wiring, such as sockets, insulating joints, switches, and they also made most of the electrical instruments used in central station switchboard work. I believe, however, that a few of the instruments were made by the Edison Lamp Company. You will see from the above that the Edison Electric Light Company owned the Edison patents for light and power, the Edison Lamp Company manufactured

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Edison Lamp Company manufactured the lamps and the Edison Machine Works the heavy machinery, such as dynamos and motors, and the Electric Tube Company the underground conductors and Bergmann & Company the miscellaneous household supplies. The next step was the formation of the Edison Electric Illuminating Company of New York. The money subscribed to the capital of this company was subscribed by the stockholders of the Edison Electric Light Company, of which Mr. Edison was the largest individual stockholder. This company went actively to work to install a central station system, as I have mentioned elsewhere, in the lower portion of the City of New York, and I think you will find that the capital was one million dollars; thirty-five per cent of this to the Edison Electric Light Company for its patent rights and licensee agreement and the balance was subscribed for at par by the stockholders of the Edison Electric Light Company, as stated above.

The enormous labor of working out a practical application of Edison's distribution system to meet the business conditions existing in a business of which absolutely nothing was known at the time, which required a development of all of the apparatus used, from the steam engine to the lamp, is almost without parallel, and I think that the payment of dividends on the original capital of the Edison Electric Illuminating Company of New York is as large a monument to Mr. Edison's genius as any work he has done.

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consider that he and his associates in the manufacturing companies above referred to, are entitled to the credit of the success of the first plant of the New York Edison company. The men who are partly entitled to credit in this connection are Edison himself, Charles Batchelor, Edward H. Johnson, John Kruesi, Siegmund Bergmann and Charles L. Clark, who at that time was chief engineer of the Edison Electric Light Company, and Francis R. Upton, in the order that I have named them. Whoever else may claim credit in connection with this enterprise are of minor consequence in my judgment; and I want thus formally to state my views on this particular subject at this time, because I consider the second only to Mr. Edison's invention is the success of the Edison Electric Illuminating Company of New York in the early days as one of the prime factors in the development of the electric light and power industry. The next institution formed was the Edison Company for Isolated Lighting. This company was formed for the purpose of exploiting the sale of isolated plants throughout the United States at a time when it was difficult to get capital into the central station business and prior to the commercial success of the central station business being established. This company was officered by the same people who officered the Edison Electric Light Company, and the company ultimately was absorbed by the Edison Electric Light Company. Later

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on, when it was found very difficult to push the central station business, owing to the lack of confidence in its financial success, Edison decided to go into the business of promoting and constructing central station plants and he formed what was known as the Thomas A. Edison Construction Department, which he put me in charge of. The organization was crude, the steam engineering talent poor and owing to the impossibility of getting any considerable capital subscribed the plants were put in as cheaply as possible. I believe that this Thomas A. Edison Construction Department was unkindly named the "Destruction Department". It served its purpose, never made any money and I had the unpleasant job of presiding at its obsequies. But the fact is that the capital that was put into the business under the influence of the pioneer work done by the Thomas A. Edison Construction Department has, like all capital put into the Edison electric light business, proven a remunerative investment to anybody who had the patience to await results. The years 1883, 1884, 1885 and 1886 were very lean years for the Edison Electric Company and also for the manufacturing concerns fathered by Edison; with the exception of the Edison Lamp Company and Bergmann & Company, the main business at that time was the isolated lighting business. Bergmann & Company made large profits and so did the Lamp Company. The Electric Tube Company did so little business

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during the time that the underground central station distribution was on trial and awaiting its final success, that one year the total gross business of the company was not sufficient to pay the watchman's salary, and as a result the Electric Tube Company, which had removed from 65 Washington street to the shops of Bergmann & Company, absorbed by the Edison Machine Works, and Mr. Kruesi had become assistant general manager of the Edison Machine Works and Charles Batchelor was general manager. It was not until 1888 that the Edison manufacturing business in all its branches became a great success.

I have not the data at hand to give the exact date of the removal of the works to Schenectady. As the business of the isolated lighting developed and the small central station business began to show some life the Edison Machine Works on Goerck Street, together with the Electric Tube Works in Brooklyn, proved inadequate, and various sites were considered for establishing new shops. The Schenectady Locomotive Works had been very successful and were owned and managed by Ellis Brothers. They had an old superintendent named MoQueen, who left them and with the assistance of, I think, the Albany end of the Stanford family, built the shops on the flats between the New York Central tracks and the rear canal, just outside the city limits of Schenectady. These shops were never used. They had ten acres of land

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attached and the property was offered to the Edison Machine Works on favorable terms. Partly influenced by the success of the Schenectady Locomotive Works in getting cheap labor and partly with the idea of developing a large industrial establishment where there was elbow room, Edison decided to acquire the shops of the McQueen Locomotive Works. There was the usual delay in closing down the old works and starting the new works. Batchelor was the general manager and Kruesi assistant general manager, and I was secretary and treasurer of the Edison Machine Works, my part of the business being to take care of the finances, and when the time came to move to Schenectady, I took quite an active part under Edison's instructions, in moving the plant, and a short time afterwards Mr. Charles Batchelor resigned the general managership and became vice president and I was elected general manager and treasurer. John Kruesi was assistant general manager and was my principal and close associate and friend and worked loyally with me in the development of the Schenectady plant. At Mr. Edison's request I moved to Schenectady so as to be more closely in touch with the business. I think when we went there we took 250 men and when the plant was turned over to the General Electric Company in 1892, there were over 6000 men employed.

To go back a few years in the development and to refer to the incandescent lamp manufacturing, the Edison

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Lamp Company was the first of the manufacturing companies to have first class manufacturing quarters. Harrison was picked out because of its close proximity to Newark, which is a good labor market, and the Harrison works were bought because they were convenient for business and could be acquired for a reasonable price. These establishments worked closely in connection with Edison, whose experimental work was removed from Menlo Park to the top floor of Bergmann & Company's building at 17th street and Avenue B, directly after Bergmann & Company acquired that property. In the mean time Edison's first wife had died and he had married again, and he had purchased Glenmont, Mewell Park, Orange, as his residence. It was during the days that I was engaged in the building of the Schenectady Works that Edison built his laboratory at Orange. This work he did himself, Batchelor in the mean time building and equipping the Edison Phonograph Works on property adjoining the laboratory. Naturally as the electric light business developed the Edison manufacturing companies prospered. The Edison Electric Light Company had pursued the policy of accepting securities in local illuminating companies for their patent rights. The cash income of the Edison Electric Light Company was small and there was more or less jealousy of the success and influence of the Edison manufacturing estab-

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lishments. It was sought to grip this influence by subjecting them to licensee agreements, which agreements it was intended should cover the cost of manufactured articles to licensees of the Edison Electric Light Company. The situation became an entangled one and on the negotiation of Henry Villard, with the assistance of Siemens & Halske and the Deutsche Bank of Berlin and some other European capitalists and the firm of Drexel, Morgan & Company of New York, the Edison Machine Works, which included the Electric Tube Company, the Edison Lamp Company and Bergmann & Company, was merged with the Edison Electric Light Company under the name of the Edison General Electric Company. I think this took place in 1890. You probably have the dates of this consolidation. My recollection is that the Edison manufacturing establishments got about one half the capital and the stockholders of the dozen electric light companies and the other half of the capital with a certain reservation of capital over each interest, which went to the parties who provided the cash requirements for developing the business. By this time Charles Batchelor had retired from business; Mr. Henry Villard was elected president of the Edison General Electric Company and he was assisted in the financial affairs by J. H. Herrick as vice-president and I was elected second vice president with charge of the manufacturing and selling departments.

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The story as I have dictated it refers mainly to the people on the manufacturing side of the Edison electric light business. Amongst the principal men on the Edison electric lighting side of the business should be mentioned Mr. Grosvenor P. Lowry. Mr. Edison's acquaintance with Lowry came through his relations with the Western Union Telegraph Company; and in the early days, mainly before I came to America, Lowry was probably about the most active man in securing the cooperation of financial people, who gave Edison support in his electric lighting experiments through the agency of the Edison Electric Light Company. I do not know who was the first president of the Edison Electric Light Company, but in my time S.B. Eaton was its president. As I recall it, he was elected sometime in the fall of 1880 or 1881. For years as president of the Edison Electric Light Company and as Mr. Edison's personal counsel, Major Eaton and his firm, Eaton & Lewis, took a very active part in the business. When I became practically the active head of the Edison General Electric Company, Major Eaton's partner, Mr. Eugene H. Lewis, acted as my confidential counsel, and much of what I was able to accomplish in connection with placing central station business was owing to the very able cooperation on the legal side of affairs which I received from Mr. Lewis. Another gentleman who was active in the business in the early days was Calvin Goddard, who was secretary, and, I believe, treasurer of the Edison Electric Light

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Company, the Edison Company for Isolated Lighting, and also of the Edison Electric Illuminating Company of New York. I believe he died in 1883 or 1884.

16. Anything about distinguished visitors to the two laboratories while you were managing.

19. Any reminiscences of Villard, J.P. Morgan, or Jay Gould, or Vanderbilt, etc., in connection with Edison.

You ask me about distinguished visitors visiting the laboratories while I was managing Mr. Edison's affairs. I used to be so busy that, although I came in contact with everybody who visited him, including President Diaz, Lord Kelvin (then Sir William Thomson), Sir William H. Preece, James Gordon Bennett and the Duke of Marlborough, and all kinds of men of prominence or distinction of family from all over the world, I do not know that I call to mind any particular reminiscences of any of them. We had a great many prominent visitors and as a result these visits became mere commonplace incidents. Moreover I question whether this side of men or things appealed to me particularly; I was more interested in the development of the business and the success of the manufacturing establishments; my duties, in the earlier days of financing these establishments in their infancy and later on of managing and developing the large business

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at Schenectady and, still later on, the organization and management of the manufacturing and selling departments of the Edison General Electric Company, were matters which interested me more and impressed me more than the meeting with prominent people. So far as New York financial people are concerned, I think that if I were naming those to whom Edison is under the greatest obligation, I should name the house of Drexel, Morgan & Company, or, as it is today, J.P. Morgan & Company. In the early days Edison received the warm personal friendship and assistance of Mr. E.P. Fabbri and J. Hood Wright. Later on Mr. C.P. Coster became the really active man when it came to questions of policy in guiding the affairs of the Edison Electric Light Company and the Edison General Electric Company, and at all times Mr. Edison has had the warm regard and, when he desired it, financial cooperation of J.P. Morgan. Amongst the financial men whose close personal friendship Edison enjoyed, I would mention Henry Villard, who, I think, had a higher appreciation of the possibilities of the Edison business than probably any man of his time in Wall Street. He dropped out of the business at the time of the consolidation of the Thomson-Houston with the Edison General Electric Company; but from the earliest days of the business, when it was in its experimental period, when the Edison light and power system was but an idea, down to the day of his death Henry

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Villard continued a strong supporter of the business, not only with his influence but also with his money. He was the first capitalist to individually back Mr. Edison's experiments in electric railways, although prior to his advancing Edison money the Edison Illuminating Company had also spent some of the money in its treasury.

Memorandum by Samuel Insull on Chapter Nine, headed "The Telephone, Motograph and Microphone", copy of which was sent him by Mr. T. Commerford Martin.

In pages twelve and thirteen you tell the story in Mr. Edison's own language of his sale of the motograph patents to the Western Union Telegraph Company. Mr. Edison says the amount was \$100,000.00. This is correct, but he goes on to say later that it was paid at the rate of \$6,000 a year for seventeen (17) years. This I believe is incorrect. This particular transaction, my recollection is, was paid \$10,000.00 a year for ten (10) years, the payments being monthly, \$833.33 per month. The check was the Western Union Telegraph Company's check, if my memory serves me correctly. The \$6,000.00 payment is the one referred to by Mr. Edison on page ten. This was the \$6,000.00 a year paid for seventeen (17) years by the American Speaking Telephone Company. This check was paid monthly, \$500.00 per month, and the check came from the Gold & Stock Telegraph Company, which Company owned the American Speaking Telephone Company. A reference to Mr. Edison's accounts in his laboratory office anytime during the early eighties would tell you whether my memory is correct, or whether Mr. Edison's statement in the Chapter on the Telephone, Motograph and Microphone is correct. My recollection is that I used to get the two checks per month, one for \$500.00 from the Gold & Stock Telegraph Company and the

No. 3 was
\$833.33
month.
written

other for \$833.33 from the Western Union Telegraph Company, or a total of \$1333.33 monthly. As a matter of curiosity I would like to know whether my memory serves me correctly or not.

Referring to the story as told by Mr. Edison on pages thirteen and fourteen with relation to the autograph telephone receiver, called the loud speaking telephones, when I first went into Colonel Gouraud's service as his private secretary in January 1879, the story told around the office was that when the trouble came up with reference to the possible Bell litigation on the magneto receiver, Colonel Gouraud telegraphed Mr. Edison explaining the trouble, and expressing a fear that an injunction would issue in favor of the English Bell Company against the use of the magneto receiver. Mr. Edison replied promptly by cable as follows: "I will invent and ship a new receiver." Understand, that this cable correspondence must have taken place just before Christmas, 1878, and my knowledge of it is heresay as I did not enter Colonel Gouraud's service until January 1879.

On page fourteen you quote Mr. Edison as follows: "I made six of these receivers and sent them in charge of an expert on the first steamer". The expert whom Mr. Edison sent was Mr. Charles Edison, his nephew. It must have been in February or early in March, 1879. I went to Boston Station early one morning before daylight to meet Charlie Edison,

as we called him later. I had never seen him but presumed I would be able to find him because of his clothes and appearance, that is, I expected that he would look distinctly American, and Americans you must remember were not so common in 1879 in England as they are today. Charles Edison strongly resembled Mr. Thomas A. Edison, as shown in a picture of Mr. Edison taken in Washington with U. H. Painter and Charles Batchelor with a phonograph in the foreground. You probably recollect the picture. Charles Edison had with him the first motograph receiver and his motograph receiver was the salvation of the Edison Telephone business in England. At that time in London there was a man named James Adams, whom I remember mainly for his picturesque blasphemy. Mr. Edison had sent James Adams over to England some time in the later part of 1878 to operate the telephone. My recollection is that Charles Edison was only in London a few months. He was in more or less bad health and went on the continent, I think, just about the time Mr. Edward H. Johnson arrived in England. Mr. Edward H. Johnson arrived there on July 14th, 1879.

WILLIAM H. MEADOWCROFT PAPERS

**REMINISCENCES BY
EDWARD H. JOHNSON**

425 - 5th Avenue,

New York, Nov. 21, 08

My dear Martin:

Delany's reminiscences are only legendary when he gets back of his personal experience.

My entrance preceded Edison's in the field of auto-telegraphy as the following "true story" will show. Its interests, of course, turn solely on the light it throws on The Edison of that day.

Gen. Wm. J. Palmer and some New York associates had taken up the "Little auto system and had expended quite a sum in its development, when, thinking they had "reduced it to practice, they got "Tom" Scott of the Penn. R.R. to send his Supt. of Telegraph over to look into and report upon it.

Of course, he turned it down. The P.R.R. was "It" in those days, and while we didn't know it then we now know that the policy of the "It" is always to discourage innovation. This was the winter of 69-70. The syndicate was appalled at this report, and in this extremity Gen. Palmer thought of the man who had impressed him as "knowing it all" by the telling of Telegraphic Tales as a means of whiling away lonesome hours on the plains of Colorado where they were associated in Railroad building, and so this man - that's me - was sent for to come to New York and assuage the grief by evolving a star of hope in their firmament, if t'were possible.

My "report" was that the system was sound fundamentally, that it contained the germ of a "good thing" but needed working out. Thereupon the query arose, Who? Associated with Palmer was one Col. Josiah C. Reiff, then Eastern bond agent for the Kan. Pac. R.R. The Col. was always resourceful and did'nt fail in this case. He knew of a "young fellow who was doing some good work for Marshall Leffrets of the Gold & Stock Tel. Co. (the Ticker) and who it was said was a genius at invention and a very fiend for work. His name was Edison and he had a shop out at Newark, N.J." "Yes" quoth I "I've heard of that shop and I'm thinking he's your man". So Col. Reiff wrote and asked him in.

He came and was put in my care for the purpose of Mutual Exchange of Ideas and a report by me as to his competency in the matter.

This was my introduction to Edison.

He confirmed my view of the auto system. He saw its possibilities, as well as the chief obstacles to be overcome, viz: The "sluggishness" of the wire together with the need of mechanical betterment of the apparatus employed, and agreed to take the job on upon one condition, viz: that that man Johnson stay and help as "He was a man with ideas".

En parenthesis contrast this state of mind with that of the later day Edison of whom Delany so delightfully and truthfully speaks - "had too damned many inventors already". I've heard him many a time indulge in the same sentiment,

as for instance when he would say "I don't want ideas, I want work", and "I've more ideas of my own now than I can ever work out, I don't want to borrow any", etc. etc. Reverting - It was accordingly arranged that Edison should take up the work at once, and that I should be given a 3 months leave from my Colorado Railroad building - (it was then the Denver & Rio Grande) - and unite with Edison in this work. I never saw Colorado since, but I've seen a lot of Edison.-- another parenthesis -- Note Delany's confirmation of my tale about the auto system & Jay Gould. The W.U. would'nt have it, but Jay made the Vanderbilt's give him the W.U. for it - at least that's practically what the transaction amounts to.

Edison sold his quadruplex to Jay Gould quite independently of the auto transaction and received \$40,000 for it.

The auto people subsequently made a claim that the quad belonged to them under this agreement with Edison for all inventions "applicable to " automatic telegraphy - this issue became the crux of a legal battle in which many experts were requisitioned. Edison was one - D'Infreville another, and I a humble third. Gen. Ben Butler, Grosvenor P. Lowry & Edward M. Dickerson were some of the Big Legal Luminaries engaged. Gould won for all practical purposes, since he and his successors have managed to keep the case

in the courts ever since. Edison's auto & quad work was not immediately succeeded by the electric lighting, but by the carbon telephone and incidentally the "motograph telephone" and the phonograph - then came the Light Sub-division - glorious epoch.

So much for a review of Deàany.

Now for a few words of my own.

The Centennial exhibit at Philadelphia in 1876, Sir Wm. Thomson's visit, I remember were bringing the Thousand words - with a few to spare - over the wire from New York in 57 seconds, and Sir William's delight at the clearness of the recorded characters. He took the roll as it came from the instrument, and it became a treasured memento to his Laboratories at Glasgow. On the occasion of this visit, Bell's telephone was also inspected and I recall the very great reluctance shown by Sir Wm. to admitting that he heard an articulated word - Watson, Bell's Asst. urged the savant to "listen carefully" and after many efforts the concession was finally made. "Yes, I think I heard it all right."

Now, as to the Phonograph exhibits in New York. I am very hazy. There were many of them. Hilbourne Roosevelt, Charlie Cheever, Gardiner G. Hubbard, W.H. Painter, a man by the name of Bradley from Rhode Island and myself were the original Phonograph Syndicate or corporation, and I had charge of exhibits. I made many, and I have an indistinct recollection of the telephone connection with

Roosevelt's organ factory, the organ recital, etc., but I shall have to talk these things over with some one who can recall them before I can contribute much in that line.

The Phonograph exhibit you speak of was at 14th Street & Fifth Avenue. I am not sure whether it was the first or not. The man "Yates", Edison speaks of was "Yost" and the "type setting" machine was the original "Typewriter" if I am not mistaken, and the association was with the auto telegraph and not with the phono. At least I have no recollection of a type setting machine, while I have a clear recollection of the "original Jacobs" of the modern typewriter. It was an immense wooden affair and was being developed as a means for quickly translating the telegraphic characters from the chemical strip to type printed sheets. But this may not be what is in Edison's mind. It is an interesting point, however. Delany and Edison will both recall it.

If you will submit material to me I will review it as I have Delany's and may in that way contribute not a little, while incapable of original recollection of value.

Yours truly,

(Sd.) E.H. Johnson.

Col. J.C. Reiff is still living and has a memory like an engraved stone. I've no doubt he and I could evolve much. I'll have a talk with him.

E.H.J.

P.S. I can give you the true origin of the phonograph if Edison does not object. Its interesting but there's a foolish notion I think in the Old Man's mind that it in some way detracts from the honour and credit due him. As a matter of fact it doesn't in the least, and it is a heap more interesting than the cooked up tales that Tom, Dick and Harry have invented.

*Belamy was one of old time inventors
of telegraph apparatus. T.A. had
great regard for him.*

WILLIAM H. MEADOWCROFT PAPERS

**REMINISCENCES BY
WALTER S. MALLORY**

C O P Y

EDISON PORTLAND CEMENT COMPANY

P.O. Address, Stewartville, N.J.,

June 8, 1908.

Mr. T.C. Martin,
239 West 39th Street,
New York, N.Y.

Dear Mr. Martin:-

I beg herewith to enclose four additional stories, per my recent promise. Have you among the stories already submitted to you any mention of the arrangement between Mr. Edison and the Edison Lamp Works, covering the cigars which they voted to give him and which were given him for a number of years. There are so many people who know this story that the chances are you have already received it. If not, I will be glad to send it to you.

With kindest regards, I am,

Yours very truly,

(Sd.) W.S. Mallory.

[ATTACHMENT]

The problem of concentrating low grade iron ore was started at the time iron ore was selling at about \$6.50 per ton. Before the plant was in shape to attempt to run commercially, the large deposits of steam shovel iron ore at ~~Mesa~~ Mesaba were discovered and opened up, and when the plant was put in commercial operation, iron ore was selling for about \$3.50 to \$3.75 per ton, and it was found there was strong probability that with such a low market price the scheme could not be worked out to a commercial success. Mr. Edison then turned his attention to utilizing the experience and knowledge he had gained in the work on the iron ore proposition, and applied it to the manufacture of Portland Cement, and designed and built the large works now located at New Village, N.J., which have a capacity of over 8000 barrels per day.

The funds for the iron ore concentrating problem were largely furnished by Mr. Edison, and over two million dollars was spent in the attempt to solve the iron ore problem. During the boom times of 1902, when General Electric sold at its high-water mark of about \$330, Mr. Edison and the writer were on their way from the cement plant at New Village to his home at Orange, N.J. When we arrived at Doyer, N.J., we got a New York paper and the writer called Mr. Edison's attention to quotation on General Electric of that day. Mr. Edison said, "If I hadn't sold any of my General Electric, what would it be worth today?" and the writer after doing some figuring

[ATTACHMENT]

replied, "Over four million dollars". When Mr. Edison is seriously thinking of a problem, he is in the habit of pulling his right eyebrow, which he did for 15 or 20 seconds, then his face lighted up and he said, "Well, it is all gone, but we had a hell-of-a-good-time spending it".

[ATTACHMENT]

- STORAGE BATTERY WORK -

When Mr. Edison first started actively on the work out of which resulted the present storage battery, he said to the writer that he had only one determination, and that was absolutely not to work with lead and sulphuric acid, but that he had the feeling that what he wanted to accomplish ought to be found in a combination of nickel and iron. His method of working was as follows:

In one of the chemical laboratories he had eight or ten chemists and experimenters, and in the rear room in this building Mr. Edison had a bench which was about three feet wide and twelve to fifteen feet long, on which he had hundreds of little test cells, the material in which had been made up by the chemists and experimenters under his directions. During the period of this work and for over a year Mr. Edison's schedule of work was as follows: He would reach the Laboratory between 7:30 and 8:00 A.M., his lunch would be sent to him from his home at noon, then at half past six the carriage would come for him and he would be driven to his home for dinner, then by eight o'clock he would return and the carriage would come for him at midnight and would frequently be one, two or three o'clock before he would go home, and on very many occasions the carriage, after waiting until three o'clock, would be sent home and what little sleep Mr. Edison would get would be obtained at

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the Laboratory. This schedule went on six days a week, and for very many weeks seven days. The larger part of the time Mr. Edison would be seated before the table already mentioned, testing, figuring, planning, getting practically little or no exercise, and for weeks and months apparently not getting any results from the materials with which he was testing.

After the experiments had gone over 9,000, the writer allowed his sympathy to get the better of his judgment, and said to Mr. Edison: "isn't it a shame that with the tremendous amount of work you have done, that you have not been able to get any results", and Mr. Edison looked up and smiled, saying: "Results? Why, I have gotten a lot of results. I know several thousand things that won't work."

[ATTACHMENT]

- AUTOMOBILE REPAIRS -

About two years ago the writer had a motor car of a make of which Mr. Edison had already had two cars, and when the car was received he made inquiry as to whether any repair parts were carried by any of the various garages in Easton, Pa., and learned that this particular car was the only one of its kind in Easton.

Knowing that Mr. Edison had had an experience lasting two or three years with this particular make of car, the writer determined to ask him for information relative to repair parts, so the next time I was at the Laboratory, I told him I was unable to get any repair parts in Easton and that I wished to order some of the most necessary, so in case of breakdowns, I could not be compelled to lose the use of the car for several days until repair parts could be had from the factory, and asked his advice as to what I should order, to which he replied: "I don't think ^{it} ~~it~~ will be necessary to order an extra top".

[ATTACHMENT]

- A GAME OF BILLIARDS -

Along in the latter part of the '90s, when the work of the problem of concentrating iron ore was in progress, it became necessary when leaving the concentrating plant at Edisop, N.J., to wait over at Lake Hopatcong one hour for a connecting train. During some of these waits Mr. Edison had seen the writer play billiards. At the particular time in which this incident happened, Mrs. Edison and her family were away for the summer and the writer was stopping at Mr. Edison's home.

One hot Saturday night, after Mr. Edison had looked over the evening papers, he said to the writer, "Do you want to play a game of billiards?" Naturally this astonished me very much, as Mr. Edison is a man who cares little or nothing for the ordinary games, with the single exception of parchesi, of which he is quite fond. I naturally said "Yes, I would like to play", so we went into the billiard room of his home and the writer took off the cloth, got out the balls, picked out a cue for Mr. Edison and when we banked for the first shot the writer won and started the game. After making two or three points he missed, and a long carum shot was left for Mr. Edison, the cue ball and object ball being within about twelve inches of each other and the other ball a distance of nearly the length of the table. Mr. Edison attempted to make the shot but missed it and said; "Put the balls back", so I put them back in the same

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-2-

position and he missed it the second time, and I continued, at his request, to put the balls back in the same position for the next fifteen minutes, until he could make the shot every time, then he said: "I don't want to play any more".

I like to tell this story, as it illustrates the ever-present determination to conquer whatever he undertakes.

[ATTACHMENT]

- AN ELABORATE LUNCH -

Some years ago, we had on a business negotiation in New York, which made it necessary for Mr. Edison and the writer to visit New York five or six times within a comparatively short period. It was our custom to leave Orange about 11:00 A.M., and on arrival at New York to get our lunch before keeping the appointments, which were usually made for two o'clock. Several of these lunches were had at Delmonico's, Sherry's and other places of similar character, but on the day in question, while en-route from Orange to New York, Mr. Edison said: "I have been to lunch with you several times, now today I am going to take you to lunch with me, and give you the finest lunch you have ever had". I asked him, "Where are we going?" to which he replied, "You wait and see".

When we arrived at Hoboken we took the down-town ferry and when we arrived on the New York side, Mr. Edison led the way to Smith & McNeill's, which is opposite Washington Market. We went inside and as soon as the waiter appeared Mr. Edison ordered apple dumplings and a cup of coffee for each of us. He consumed his with the greatest possible pleasure, then as soon as we had finished he went to the cigar counter and purchased a cigar, and as we walked to keep the appointment, he told me the following story:

When he left Boston and decided to come to New York

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he had only money enough to reach New York. After leaving the boat, his first thought was a breakfast, but he was without money to obtain it. However, in passing a wholesale tea house, he saw a man tasting tea, so he went in, and asked the man if he might have some of the tea, which the man gave to him and in this way he obtained his first breakfast in New York. He knew a telegraph operator in New York and on him he depended for a loan to tide him over until such time as he obtained a position. During the day he succeeded in locating this operator but found that he also was out of a job and that the best he could do was to loan Mr Edison one dollar. which he did, this amount of money representing both food and lodging until such time as a position could be obtained. Mr. Edison stated that after the time consumed and the result of the exercise from walking while he was locating his friend, that he was extremely hungry and that he gave most serious consideration as to what he should buy in the way of food and what particular kind of food would be most satisfying and filling, with the result that he decided on an apple dumpling and a cup of coffee, which he had at Smith & McNeill's. He was fortunate enough the following day to obtain a position, so that he was then able to live in a normal way.

[ATTACHMENT]

- A MEASURE FOR MEDALS -

During the winter preceding the last World's Fair, a European Scientific Society advised Mr. Edison that it had voted him a Gold Medal for his scientific work, and their representative would stop on his way to the Fair and deliver the Medal in person. During July or August of the following year, on an exceedingly hot day, their representative called at the Laboratory and tried to get the Gate House man to take his card to Mr. Edison. This man has had many years' experience in meeting visitors and he tried to learn the business of the representative, who spoke English very imperfectly and very rapidly. As the Gate House man was unable to learn the mission of the visitor, who seemed from his dress and manner to be a person of some importance, he came to the office of the writer and told him the circumstances, and asked him to look the visitor over. When the writer reached the Gate House, he found the visitor red in the face, with the perspiration rolling off of it in streams, and very much excited, and he let forth a torrent of talk of which the writer was unable to understand anything except that he caught the word "Medal". Happening to remember the letter of the previous winter, I asked him if he was the representative of the Scientific Society, and he was so glad to be identified that he nearly fell on my neck, so I invited him into the Library and apologized for the

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delay in his obtaining entrance, explaining to him the many schemes that had been tried to obtain entrance in the Laboratory. When he was somewhat cooled off, I went upstairs and found Mr. Edison on the second floor of the Laboratory in the furnace room, where he was conducting some experiments with carbon. As already stated, the day was intensely hot, and I found Mr. Edison in a sad-looking state. He had on as few clothes as possible and his hands and face were streaked with the carbon with which he was working. I explained to him that the representative from the Scientific Society, from whom he had heard the previous winter, was in the Library and was ready to deliver the Medal. Mr. Edison declined to go downstairs, saying to me "You take it, and explain to him that I am very busy with an experiment, which I cannot very well leave." I protested, but Mr. Edison said: "No, I will not go down", so I went down to the Library and explained to the representative that Mr. Edison was very busy in the midst of a very important experiment which he could not leave, and that he had instructed me to take the Medal. The representative of the Scientific Society very justly declined to deliver the Medal to me, saying that if he couldn't see Mr. Edison on that day he would come the following day, or any other day which we would appoint. Knowing that it might be just as difficult to meet Mr. Edison on a subsequent day, I returned to the second floor and told Mr. Edison what the representative of the Scientific Society had

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said ~~as~~ as to making another call, then I said: "You can see him just as well today as later; now, if you do not want to go downstairs, let me bring him up into the furnace room and see him here," to which Mr. Edison replied: "No, I won't have him up here, and if I've got to see him I suppose I will have to go downstairs". So, just as he was, all perspiration and dirty, he accompanied me to the Library and I introduced him to our visitor who seemed to be very much shocked at his appearance. He however took the Medal out of his pocket and started in and made quite an elaborate speech of presentation, which was delivered so rapidly, and his English was so poor that neither Mr. Edison or the writer understood one word of it. When he had finished, he handed the Medal to Mr. Edison, who took it and simply said "Thank you". There was a pause, and then with the evident intention of making conversation, our visitor said in broken English but slowly enough so that both Mr. Edison and the writer understood: "I believe, Mr. Edison, you have other Medals", to which Mr. Edison replied: "Yes, I have a couple of quarts of them up at the house", which it is needless to say astonished our visitor very much and he subsequently mentioned the fact to me several times that he could not see how a man could value Medals by quarts.

[ATTACHMENT]

- A FINANCIAL TRANSACTION -

From the proceeds of the sale of the stock of the General Electric Company which Mr. Edison received at the time of the consolidation of the Edison General Company and the Thompson-Houston Company for his stock in the former Company, Mr. Edison started on the problem of concentrating low grade iron ore and established works at Edison, N.J., where he personally worked for a period of eight or nine years. The work was of the most trying nature, the number of disappointments far outnumbering those of success, and Mr. Edison's working hours for six days a week averaged the above period fully 17 hours a day.

During the latter part of the panic in 1893, there came a period when we were very hard up for ready cash due largely to the panicky conditions, and a large payroll had been raised with considerable difficulty. A day or two before pay-day, our Treasurer called me up by 'phone and said, "I have just received the paid checks from the bank, and I am fearful that my assistant, who has forged my name to some of the checks, has absconded with about \$3000." I immediately went to Mr. Edison and told him of the forgery and the amount of money taken, and in what an embarrassing position we were for the next pay-roll, and when I had finished, he said,

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"It is too bad, the money is gone, but how can we turn the loss of it to our advantage?" Then continuing, he said, "I tell you what you do; go and see the President of the Bank which paid the forged checks, get him to admit the Bank's liability and then say to him that Mr. Edison says he does not think the Bank should make good the loss because he happened to have a dishonest clerk in his employ". "Also say to him that I shall not ask them to make the amount good". This was done, the Bank admitting its liability and being much pleased with Mr. Edison's action. When I reported to Mr. Edison what had been done, he said: "Wait a couple of weeks, then go down and strike them for some good sized loans," which I did and obtained, and the loans were of the greatest possible help to us at that particular time.

Personally, this little experience has been of the greatest possible aid to me, as whenever I get up against an adverse unexpected situation, the first thought which comes to my mind is, "It is too bad, but how can I turn it to my advantage."

WILLIAM H. MEADOWCROFT PAPERS

**REMINISCENCES BY
FRANCIS R. UPTON**

[PHOTOCOPY]

Mr. J. R. Upton's

- MEMORANDUM REGARDING THOMAS A. EDISON -

Mr. Martin writes me regarding my reminiscences.

I first saw Mr. Edison in 1877 when I went to Menlo Park from Princeton with Mr. Howard R. Butler. I found Mr. Edison busily engaged on telephone work and beginning to get some results.

The next year, after I had been to Germany for a year studying under Helmholtz, I again saw Mr. Edison. He had offered Mr. Butler a position as Assistant, desiring a trained man. Mr. Butler passed the position on to me. I was engaged by the Company which was backing Mr. Edison at the time, as a mathematician. In my testimony in the Filaret case is an account of my first interview with Mr. Edison and the questions he asked me.

I found Mr. Edison at that time wonderfully familiar with the electrical laws. His knowledge was far ahead of any text book knowledge, as his experience in inventing the quadruplex and the automatic telegraph, had given him a very clear insight into the laws of E.M.F. and of resistance of circuits. He had from experience completely realized the effect of high resistance and low resistance in combination with batteries of various strength.

[PHOTOCOPY]

What has now been made clear by means of accurate nomenclature was then very foggy in the text books. Mr. Edison had completely grasped the effect of sub-division of circuits, ~~the~~ and the influence of wires leading to such sub-divisions, when it was most difficult to express what he knew in technical language.

The accurate nomenclature was found only in higher treatises on electricity such as were contained in the encyclopaedia Britannica and in the German text books.

I remember distinctly that Mr. Edison gave me the problem of placing a motor in a circuit in multiple arc with a fixed resistance, and I had to work the problem out entirely as I could find no prior working out of this problem. There was nothing that I could find bearing upon the counter E.M.F. of the armature and the effect of the resistance of the armature on the work given out by the motor.

It was a wonderful experience to have problems given me out of the intuitions of a great mind, based on enormous experience in practical work, and applying to new lines of progress.

One of the main impressions left upon me after knowing Mr. Edison for many years, is the marvelous accuracy of his guesses. He will see the general nature of a result long before it can be reached by mathematical calculation.

Mr. Edison's greatness was always to be clearly seen when difficulties arose. Difficulties always seemed to make

[PHOTOCOPY]

him cheerful and start him thinking, and very soon would come a line of suggestions which would not end until the difficulty was met and overcome or found insurmountable.

I have often felt that Mr. Edison purposely got himself into troubles by premature publications and otherwise, so that he would have a full incentive to get himself out of the trouble.

Another point about Mr. Edison in his experimenting. His day ~~is~~ is twenty-four hours long for he always has worked whenever there was anything to do, whether day or night, and carried a force of night workers so that his experiments could go on continually. If he wanted material he always made it a principle to have it at once, and never hesitated to use special messengers to get it.

I remember in the early days of the electric light he wanted a mercury pump for exhausting the lamps. He sent me to Princeton ~~to~~ get it; I got back in the evening to Metuchen and had to bring the pump to the Laboratory on my back that evening, set it up, work all night and the next day, getting results.

The development of the electric lamp is well told in the testimony given in the filament lamp case.

There were two or three things that I feel especially proud of in this development. One is that when the first carbon filament lamps were made, the question was often asked whether they would flicker when one lamp was put in multiple with another. It was my privilege at that time to have in my hands the second carbon filament lamp when there was another one still in burning condition. I remember very well hav^{ing} the first one lighted on

[PHOTOCOPY]

a table in the middle of the laboratory upstairs at Menlo Park, and then lighting the second lamp along side of it without affecting the first lamp.

I knew this would be the case, as the low resistance armature was in the dynamo, the circuits were of low resistance and the lamp was of high resistance and the galvanometer also demonstrated that there would be no change or flickering in the first lamp when the second was lighted.

Another incident at Menlo Park was that the first lights placed in a dwelling house were placed in my house opposite the station. This happened to be the case because the wires had been run down there first, and had not been run to Mr. Edison's house. The result of this was that the first illumination of a private room was made in this house by means of a filament lamp.

In this house Mr. Grosvenor P. Lowrey suggested hanging the lamps high up on the walls in the corner of the rooms. This was done first in the room on the north side of the house.

Another installation which I had to do with was that of the steership Columbia. I took the lamps personally in a basket for this installation, and had charge of the installation. Mr. Wilson P. Howell was on the boat under me in charge.

During the invention of the incandescent lamp, though Mr. Edison was under great strain and working parotically all the time, he was usually in good spirits, and would often in the middle of the night when the luncheon was served, go to the organ

[PHOTOCOPY]

at the end of the Laboratory and play tunes and come back and crack jokes.

Mr. Charles Batchelor was Mr. Edison's principle assistant at that time. He was a most intelligent, patient, competent and loyal assistant to Mr. Edison. I remember distinctly seeing him work many hours to mount a small filament, and his hand would be as steady and his patience as unyielding at the end of these many hours as it was at the beginning, in spite of repeated failures. He was a wonderful mechanic, and the control that he had of his fingers was marvelous, and his eye sight was sharp. Mr. Batchelor's judgment and good sense were always in evidence.

Mr. Kruesi was the Superintendent. He was a splendid mechanic with a vigorous temper, wonderful ability to work continuously, and to get work out of men.

It was an ideal combination, that of Edison, Batchelor and Kruesi. Mr. Edison with his wonderful flow of ideas, which were sharply defined in his mind as can be seen by any of the sketches that he made, as he evidently always thinks in three dimensions. Mr. Kruesi, willing to take the ideas, and capable of comprehending them, would distribute the work so as to get it done with marvelous quickness and great accuracy. Mr. Batchelor was always ready for any special fine experimenting or observation, and could hold to whatever he was at as long as Mr. Edison wished him to, and always brought to bear on whatever he was at the greatest skill.

[PHOTOCOPY]

Mr. Kruesi was a Swiss and trained in the best Swiss ideas of accuracy. Mr. Batchelor was an Englishman and came to this country to set up the thread weaving machinery for the Clark Thread works.

I have often felt that Mr. Edison never could comprehend the limitations of the strength of other men, as his physical and mental strength have always seemed to be without limit. He could work continuously as long as he wished and had sleep at command. His sleep always was instant, profound and restful. He has told me that he never dreamed. I have known Mr. Edison now for thirty years, and feel that he has always kept his mind direct and simple, going straight to the root of troubles. He also has kept a warm feeling of regard for his old associates, and a great many times has done great kindnesses to those who have been associated with him, always in an inconspicuous way.

One of the peculiarities I have noticed about Mr. Edison is that I have never known him to break into a conversation going on around him and ask what people are talking about. The nearest he would ever come to it was when there had evidently been some joke told and his face would express a desire to laugh, that would immediately invite telling the joke to him.

Regarding the creating of the lamp works. When Mr. Edison had made a number of lamps he began illuminating Menlo Park. The glass work of the lamps were first made for this in the photographers house on the north of the Laboratory by Messrs.

[PHOTOCOPY]

Boehm & Holtzer, the exhaustion of the lamps was carried on in the east end of the laboratory upstairs, where the mercury pumps were. Mr. W.J. Harner kept the records of the lamps for some period.

Mr. Batchelor took up the lamp manufacture and method of manufacture. He started the work in the old "Pen Factory" as it was called, on the other side of the railroad from the Laboratory.

In the exhaustion of the lamps mercury was used freely and appliances were poor, and the mercury got all through the building. The result was that Mr. Batchelor and several others were badly salivated. The charge of making lamps was turned over to me and Mr. Batchelor was sent to Paris.

At this factory the present basis of the lamp was gotten up and standards fixing this base were sent to England France and Germany, where lamps were being made. The works were moved to Harrison and I continued in charge for several years until such a time as the business had grown to what then seemed to be large dimensions. At the Menlo Park factory, Prof. Nichols who is now at Cornell was in charge of the photometric work. The rapid and accurate measuring of lamps and testing lamps for their durability were problems of great moment in the early making of lamps. It was at the factory in Menlo Park that the method of being lamps up to a very high incandescence while they were being exhausted was first practised.

For several years Mr. Edison gave his principle attention to the development of the Underground system and central

[PHOTOCOPY]

station appliances. For a short time he was at the lamp works at Harrison fitting up a laboratory in the upper story. This was just before he built his Orange Laboratory. There are quite a number of note books of this time which show that Mrs. Edison witnessed Mr. Edison's signature in the note books as she was often at the laboratory in Harrison, helping him experiment.

MUCKERS OF THE EDISON LABORATORY

These records, which cover the period 1902-1909, consist of a minute book and a small amount of unbound material pertaining to the organization known as the Muckers of the Edison Laboratory. Founded in 1902, the Muckers was a select, dues-collecting fraternity of employees at the West Orange laboratory. Its founding members included James B. Ballantine, Cloyd M. Chapman, and John O. Roos. Among the early inducted members were Edward P. Dinan, Frank L. Dyer, George Heatherington, John V. Miller, and Martin A. Rosanoff. The minute book includes a list of members, an account of business meetings, and occasional references to Edison, along with comical reports of periodic "outings" by the club. The unbound material consists primarily of postcards and other correspondence from members and former members. The records are arranged in the following order: (1) Minute Book; and (2) Correspondence. A finding aid for the archival record group is available at the Edison National Historic Site.

Minute Book

This minute book contains an account of business meetings of the Muckers of the Edison Laboratory from August 1902 through February 1908, along with a sequentially numbered list of members. Next to most of the names is a notation of the month and year that the member entered into Edison's employ. Many of the entries indicate the date on which the individual left the laboratory, and a few also include a date of death or resignation. Particularly during the period in which A. Theo E. Wangemann served as secretary (1904-1906), the minutes contain numerous jokes and sketches, along with comical reports of periodic "outings" by the club, usually to dining and drinking establishments in New York City. The minutes are revealing of the work culture at the West Orange laboratory, and there are occasional references to Edison, who joined in one of the club's more sober outings in 1906.

Correspondence

This folder consists primarily of postcards and other correspondence from members and former members of the Muckers of the Edison Laboratory. Included are letters by James B. Ballantine and Nils Traaholt, written at the ore milling plant in the Dunderland region of Norway, where both men were working in 1905. Other items include bills for dinners, humorous sketches by A. Theo E. Wangemann, and various versions of the organization's constitution.

**Muckers of the Edison Laboratory
Minute Book**

This minute book contains an account of business meetings of the Muckers of the Edison Laboratory from August 1902 through February 1909, along with a sequentially numbered list of members. Next to most of the names is a notation of the month and year that the member entered into Edison's employ. Many of the entries indicate the date on which the individual left the laboratory, and a few also include a date of death or resignation. Particularly during the period in which A. Theo E. Wangemann served as secretary (1904-1906), the minutes contain numerous jokes and sketches, along with comical reports of periodic "outings" by the club, usually to dining and drinking establishments in New York City. The minutes are revealing of the work culture at the West Orange laboratory, and there are occasional references to Edison, who joined in one of the club's more sober outings in 1906.

The cover is stamped "Record" and is marked "of Muckers." The spine is marked "Minutes," "Muckers," and "Edison Laboratory Orange, N.J." The book contains 239 numbered pages. Some of the pages are blank; pages 23-24 have been removed from the book. Photographs, postcards, newspaper clippings, and other items have been inserted into the book.

cl. 1269

ES9667



In Orange 1902.

40

20



At Edison mines in 1896.

1-

"St. Muckers" is the title
Mr. Thomas A. Edison addressed
often his Experimenters in
Laboratory, when in a happy
frame of mind.

"Muckers" therefore was
chosen as the title of
this association.

MUCKERS
OF THE
EDISON LABORATORY,
ORANGE, N. J.

Minutes of the
Mucker society
 of the
Thomas A. Edison Laboratory
 at
Orange. N. J.

List of members on page 221. & 215. ^{names address}

Constituting Meeting.

Aug. 24, 1902.

A meeting of the experimenters of Edison Laboratory was held in the Gold-
building on Aug. 24, 1902, when it was
decided to form a Muckers Society.

J. B. Salterton being the oldest
Mucker was elected Chief and

C. Chipman as secretary pro temp.

J. O. Ross was elected secretary with
effect after his initiation.

It was decided to initiate

G. Kitherington on the evening of Aug. 29
at Highland Park.

J. B. Salterton
Chief

John O. Ross
Secr.

1st Initiation meeting.

On the evening of Aug. 29th
 J. Ketherington was initiated at
 Highland Park taking the title
 of Musker by 5.

Ross made a good in-
 vestment and afterwards had
 trouble to find out whether
 "rabbit" at the corner was beest
 or bird; any way he felt sure
 that the stuff never had been
 thoroughly killed.

J. B. Baclantine
 Chief

John D. Ross.
 secy.

2nd Initiation meeting.

On Sept. 4th J. O. Ross was initiated at Highland Park, taking the title of *Masker No. 6*.

Bad investment.

Afterwards adjournment to "Comer" and Kitherington discovered the difference between watering a garden and "watering" stocks.

J. B. Ballantine
Chief

John O. Ross.
Sec.

3^d Initiation meeting.

On Sept. 17th K. Morris was
initiated at Music Hall taking
title of Macker No 7.
"Blue Jean" being the dose.
No rabbit at the corner.

J. B. Baccantini
Chief

John O. Ross.
Secy.

4th Initiation meeting.

On Oct. 23^d R. Raper, having returned from Europe was initiated at Blaney's Theater, Newark, taking title of Broken W.H.

The villain in the "Strangers of Paris" was duly appreciated.

The company proceeded to enjoy education, eat and a glass of beer in Pomodoro, and then went to Market str. to develop love for their neighbors.

J. B. Sacchini
Chief

John O. Ross.
Sur.

Social Meeting.

On Oct. 30th Chief Ballentine took the Muckers to Waldman's to witness a legshow.

Thlends on Market str. was then honored with a visit and following business was transacted.

Highballs.

R. Rapp was elected Treasurer.

Other Highballs.

C. Chapman was appointed a delegate to call on Messrs Warren and Coving in regards their initiation as Muckers.

Mr Chapman was also appointed as a subcommittee of one to draw up Membership cards and Bylaws.

Highballs and Peanut brittle.

Decision that any good jokes be incorporated in the minutes.

Chapman has another one.

More Highballs.

Special train to West Orange at

14

1:15 a.m.

"Chapman, I have an excuse,
my foot pith is crooked." (Ross)
Karris appeared at the Lab. the
following morning at 2 p.m., and said
he did not feel sick.

J. B. Ballantine
Chief

John O. Ross
Sec.

15

Business meeting.

A meeting of the Muckers was
held in the "Bumery" on Nov. 6th.
Chief Ballantine in the chair,
the other standing.

Mucker No 2 Chapman reported
that he had talked with Warren
and Corving in regards their syndi-
cate proposed to take the Muckers
to Newark Theater.

On the motion of Chapman,
seconded by Hotherington it was
decided that two separate institutions
be made, the Muckers to pay half
the expenses, the candidates the other
half. Warren being the oldest, to
be the first and Wednesday the 11th to
be the night of initiation.

Moved by Hotherington, seconded
by Karris and resolved, that for covering
of expenses said evening, each member
have to make an advancement of \$1.25.

Aggagagagagag
Chief

John O. Ross
Sec.

5th Initiation meeting.

On the evening of Nov. 11th a meeting was held for the initiation of W. A. Warren as Wuehen M. S.

The Wuehens at former meetings having satisfied their desire for physical beauty had this time chosen to analyse the intellectual depths of the "Forador" at Newark Theater.

Chapman approved the tendency of the play but kicked over the girls not kicking high enough.

After the play the meeting was adjourned to Tjffend's banquet hall.

Numerous "Kuhnsbrochers" and "Dogs" having been consumed following business was transacted.

The minutes of all previous meetings were read and approved.

Subcommittee Chapman submitted a sketch of constitution and bylaws.

Ketherington moved, Ross seconded that officers be elected; Chapman

would the amendment, seconded by Kufu that they be elected unanimously. The amendment was resolved. Chapmen reported on Membership cards.

Mr P. F. Coving was proposed as a member of the Muckers and unanimously elected, the time for his initiation to be set upon later.

Due to Mr. Kithringtons sleepy appearance (how about the Kufu bekers) the meeting was adjourned at 1 o'cl. Well, - no, sick.

On the way home Freddy was picked up, ashamed of being detected at that late hour.

J. B. Ballantine
Chief

John O. Ross
Secr.

Business meeting.

On Nov. 21 a meeting was held in the brewery, where following business was transacted.

The treasurer made his report.

Covings initiation was set for Dec. 3 and St. Waldmuns with seats 50 much in front of the orchestra as possible.

Harris moved, Warren seconded that 25 cents be weekly assessed, the first assessment to be paid on Friday Nov. 22.

As dimmature was passed Harris couldnt be hold any longer and the meeting adjourned.

J. B. Ballantine
Chief

John O. Ross
Secr.

6th Initiation meeting.

On the evening of Dec. 3rd, 1902
a meeting was held for the initiation
of P. F. Conroy as member No 9.

Remembering Hetherington's profound
admiration for Waldmen's it was
decided to pull it off at that place.

Hetherington was amply rewarded
with go-go-jumps from one of the girls
displaying remarkable skill in hand-
ling her eyes independently of each
other.

The members being deeply impressed
by the atrocity had to recover at
Ifflands by means of logs, kahulakus,
cigarettes and other vegetables.

Member No 3 Miller was welcomed
for the first time being present
at a meeting was welcomed to the
company in an eloquent speech by
chief Ballentine.

Well, - no sick!

The meeting was adjourned at 1 o'cl.

S. B. Ballentine John D. Rose

Business meeting.

On Jan. 6, 1903 a meeting was held in the brewery and following business was transacted.

Next meeting was set for Saturday evening Jan. 10th, to take place at "Little Hungary", N.Y. City, an elaborate dinner to be consumed.

It was resolved to invite Freddy Ott for the occasion.

It was resolved to take the mugshots as soon as possible.

The meeting was adjourned.

J. P. Hallam
Chief

John C. Ross
Sec.

Social meeting.

On the evening of June 15th the
members made the journey to N.Y.
City and assembled at Little Hungary.

The absence of Frohly was much
regretted, but he had valid excuse,
as his pants happened to be at the
tailor that day.

The other guests at L. Hungary
being notified of the event, appeared
in evening dress and 120 girls. The
wine at the dinner was of best
make, as Hetherington said, probably
from Eimer & Amend.

Numerous speeches were held
at other tables, and the music played
"In the good old summertime" and "Mr
Dorley" to perfection.

After the dinner the members
proceeded to the cafe to enjoy some
tobacco. In the cafe was a large
crowd assembled, of different sexes,
and it was soon found out, that an

international meeting of college graduates was held at the place. Every known indian warrier and other college yells wassail off, and at last everybody in the place considered himself graduated from at least three colleges and born in a couple of different countries.

There was a general indulgence in Wine, Women & Song; the musicians, always taking the intellectual lead kept up the song, and some other people, a scotchman, college chum of Ballantine's, and another frenchman with their friends liked our wine.

At 12 o'clock the place was abandoned, and after having been liberally treated by Warren with sodium salicylate, most of the musicians reached Orange the same night.

W. B. Ballantine
Chief

John A. Ross
Secy.

7th Initiation meeting.

On March 4th, 1903, a meeting was held for the initiation of N. Traskholt, who took title of member No 10.

The event was celebrated at Blaney's Theatre, where Tolstoy's "Resurrection" was played to the members' delight and satisfaction.

The general impression of the drama was that living expenses in Russia are rather high, 10 Rubels being equivalent to \$5.

At the following banquet at Iffland's the newly-initiated member eloquently expressed his satisfaction of becoming a member, and as he was shrewd enough to accompany his speech with long-bottled Nordstern he met with no opposition.

The meeting proceeded agreeably

with highballed jokes until 1 o'clock,
when it was adjourned.

J. B. Ballantine
Chief

John O. Ross
Sec.

Sept 29

Social Meeting.

On the evening of April 19, 1903,
a meeting was held by the muskies in
honor of Mr. Ballantine, who in a near
future was going to leave the muskies.

The meeting was held at Robert's
Palmyerden, 125th St. N.Y. City, and
as guests were present ex-muskies
Keris & Cowing.

A Lucullian dinner was consumed
and in lack of water different kinds
of wine had to be used. Muskies
Hetherington, after a cocktail, nu-
merous glasses of Sauterne & Rhine wine
however got thirsty and had to get
mineral at the turkey with a big salad
of beer. Cowing saturated the beer
with salt, but being a chemist, Hether-
ington soon noticed his foul trick.

Hetherington always makes a strong
point of not having his chemicals settled,
especially not in gold assays. Cowing
accruited himself as a wandering

toolbox.

From Robert the muckers proceed to Garricks to study the fair sex; the married contingent of the muckers being especially insistent. Some see however showing a plentiful lack of presence, the muckers didn't have any show for their money.

On the way home the secretary, always interested in financial matters visited the Haymarket. Although there were plenty of tips and good turns in the market, he didn't find any stock suitable for investment - purpose and surprised the muckers by his early reappearance.

The muckers reached the pier before the ferry had left.

John O. Ross
Secy.

8th Initiation meeting.

On the 15th June 1903 a meeting was held for the initiation of Mr Frank Dyer.

Mr Dyer is not a ^{being} mucker in the higher meaning of the word, just a patent leeper, his eligibility to a mucker had been questioned, but nevertheless being held in very high esteem by the muckers, they considered him worthy of every encouragement and he had been elected a member of their society, taking the title of Mucker No 11.

The meeting took place at Madison Square Garden, where bandmaster Duss presented Venice, of Italian nationality, and a concertband, both the best in the world.

The meeting was very pleasant, much to the credit and debit of Mr Dyer. He likes matching nickels and betting. He is a very nice and

philanthropic man, indeed.

The musicians enjoyed immensely the music, some numbers of which were the most classic in the world.

Chapman and the new musician were especially interested in the finale of the Valkyrie, but we have forgotten, which of them lost the lot.

The wine and ^{the} sandwiches were of excellent quality, the caviarsandwich could even not be duplicated.

Warren, highly thought of by the musicians, for his bright ideas, put up a bottle of Moët & Chandon White seal.

The weather not being inviting for an automobile drive, the musicians had to leave the place in Cabs, and after an excursion trip on the Hudson reached the most picturesque city of Hoboken.

Here the meeting was continued, the chief musician Chapman greeting the new musician welcome

and bidding farewell to Mueken Hetherington.

Chapman was toasted, this meeting being the first one with him as chief. The meeting adjourned at 12 M.

John O. Ross
Secr.

Social meeting.

On May 9, 1903, a social meeting was held, at which were present Mr. Frank Dyer, and Messrs Harris and Cowing.

The meeting took place at Herpessus Cirkus, by many people considered the greatest in the world.

Before the beginning of the great show, a number of sideshows were visited. ~~the go~~

The quality of the show cannot be expressed in intelligible English but we appreciate the foresight of the management, because we noticed that when the great show was over, all the sideshows were removed and packed in. The crowd might have been less goodnatured, and these underwriters don't take cirkuses.

At Ketrangemum, however, we found corollation in dark imported.

Mr. Dyer, this being his first visit

with the nucleus, was greatly pleased.

Chap.

John O. Ross
Secr.

9th Initiation meeting.

On July 13, 1905 a meeting was held for the initiation of Mr M. A. Rosanoff, who took the title of Muecher No 12.

As Chapman was about to leave the country for some time, he used the occasion to bid the nucleus good-bye.

As guests were presented Messrs Salmon and Keith, prominent alchemists from Australia, at the time engaged in building aircastles of gold-bubbles.

The meeting took place at Pabst's and the place gave full satisfaction.

The music was pleasant and executed by a lady orchestra; Mr Salmon was very much interested in the music.

Mr Salmon did not drink any wine, to Chapman's disappointment; they are going to have a two months trip together.

After dinner eloquent speeches were delivered for the new nucleus,

for the guests, for the old members, and for those who were not guests.

The time of the train^{not} being in accordance with the secretary's watch, they were successfully misled.

Mr. Salmond went to his hotel; of Mr. Keith's later whereabouts we are not certain, on account of certain perfumed letters we got knowledge of.

The members had to take trolley from Hoboken and reached Newark at 2.30 a.m. There they enjoyed a stop of $\frac{1}{2}$ hour. Chapman shook up acquaintance with a bag of local bread. They got very chummy friends and Chapman decided to treat his new acquaintance to a piece of meat.

The commodity was acquired in a nearly open-all-night restaurant, but although Chapen displayed most courteous manners towards the boy he persistently refused to touch the meat.

He probably recognized in it a part of some dear relative and withdrew

heavily. Chapman got angry over this

st. ungrateful behavior and threw away the meat, murmuring something about having 5 cents going to the dogs. We think his remark was only partly consistent with the fact.

After having converted a trolley into sleeping car, the members safely reached West Orange.

page

John O. Ross
Secy.

Business Meeting.

On Jan. 18, 1904, a meeting was held in Mr. Dyer's well private office, the Muckers, with the exception of Mr. Dyer, being comfortably situated on the floor. It had been resolved that Mr. Waugmann and Mr. Goldswart be invited to join the Muckers, and now the question was raised as to whether they should come in as recently inaugurated or as old Muckers, in view of their former connection with the Laboratory. The decision was reached that they should come in, Mr. Waugmann as Mucker No. 13, Mr. Goldswart as Mucker No. 14.

Mr. Dyer then moved that the form of the constitution regulating the election of ~~the~~ the Chief Mucker

It appeared, the principle of having
 of membership not being necessarily
 conducive to the Society's welfare.
 Mr. Warren seconded the motion,
 and it was decided to call a
 special meeting for the purpose of
 discussing the subject and electing
 a new Chief Mucker on the new
 principle.

The meeting was then adjourned.
 M. A. Rosauoff
 Sec'y

Business Meeting.

On Jan. 18, 1904, exactly 32 seconds after the adjournment of the previous meeting, a new Meeting was held, the Muckers being still on the floor (literally).

The amendment of the constitution previously suggested by Mr. Ryan was discussed with great heat, and it was decided to leave the choice of the Chief entirely to the discretion of the Muckers themselves. It was further decided that the Chief's term of Office should hereafter extend over a period of one year, the election being held on the third Monday in ~~December~~ ^{January}. Which amendment of the constitution was adopted unanimously, and Mr. Rafe was ^{unanimously} elected Chief Mucker for the current year. The meeting was adjourned.

W. A. Rosaway
Sec'y

Social Meeting.

On Feb. 23, 1904, a social meeting was held. Among those present was Mr. J. S. Jones, a friend of the Wangemanns. Marcus Dyer and Goldswaiter were absent.

The wedding was held in the private dining room adjoining the kitchen of a posh little inn in the Orange Valley (!).

Dr. Ross having ^{heard of} the Society
~~supplying~~ bottles of excellent Swedish
Punsch, to the consumption of which
the meeting was ^{very} devoted.
But, as, after the ^{use} of the
seventh bottle it became apparent
that further indulgence might be
dangerously stimulating, in this
climate, it was decided to ~~continue~~
restricting the 8th bottle to the
case of the Treasurer.

It was decided to send to Dr. Ross, by mail, one of the

empty bottles, including a note
of printing. cigar & slip written during the evening.
It would be useless to attempt
to describe the details of the evening.
The number of Skads (pronounced
skull) in honor of Dr. Ross
was exceeded only by the number
of witty pictures drawn by Mr.
Krausmann. Postal Cards
were sent to all the absent
members of the Society.

The society was then di-
vided into two sections, one
singing songs on foot, singing was
songs. The other peacefully taking
the money.

It was decided sometime soon
to hold a business meeting for
the purpose of discussing an
expansion of the society to include
all of the Edison experimenters &
former times.

H.A. R. 1894
Sec'y

FORM NO. 80

NOTICE.

AS MANAGERS ARE
REQUIRED TO REMIT
PROMPTLY TO THE
TREASURER, AN
EARLY SETTLEMENT
OF THIS BILL IS
REQUESTED.

February 11th 1904

NOTICE.

PLEASE MAKE
CHECKS PAYABLE TO
THE ORDER OF THE
WESTERN UNION
TELEGRAPH CO.

TO WESTERN UNION TELEGRAPH CO., Dr.

-INCORPORATED

[illegible]

On Feb. 27th 1904 a business meeting was held in Dr. Dyers Office.

Minutes were read & approved. Suggestions of extending the Club to former Experimenters were made but laid over for future consideration. This was the last meeting but Mr. Borasoff as secretary.

On Feb. 11th there was sent to Dr. Edison a telegram to the Edison Edison Edison commemorating the 25th anniversary of the first commercial Electric Lighting. The Original is attached to page 54.

Robert R. Ryer
Chief.

Alexander H. Thompson
Secretary.

A business meeting was held Dec 4
1904.

H. K. Edsall was elected
secretary - accepted.

Treasurer reported (from notes on
a blotter) cash viz. \$10⁷⁶.
Motion by Mr. Hansen: all pay up
weekly dues to Feb 23^d 1904, and
renewal payments of weekly quarters
on November 1st - Carried.

All present granted it to
hold an outing. -

Moved & carried to go to
Pahst 126th & 8th Ave N. Y. City
on Thursday Dec 8th 1904 starting
on 6¹³ train and D. L. & R.R.

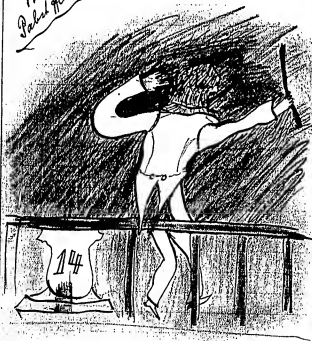
Edward Dinan was duly
elected a member. - \$14.

Moved & carried to invite
Mr. Mason & Mr. Hansen to
meeting on Dec 8th -

Adjourned.

Approved 1904.
H. K. Edsall Secy
Robert R. Jensen Pres
John M. Muehlen Chief Clerk

58
VESSELIA (over)
Pabel Harlem Dec 8th 04.



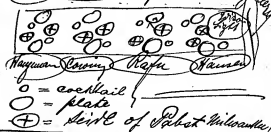
59

Outing of December 8th 1904.

On Dec 20th All The Muckers had been notified either verbally or by mail. Replies up to date were received from Gettysburg now in business in Reading, from Mucker 12 - no address given.

The Muckers & minor friends
in batches of ones & twos assembled
in Cabot's Hall, whose proprietors
Mr. Meyer had reserved a well
laid out table (which gave promise
of food & drink) directly opposite
McClure's in the gallery.
The table organized as follows

Miller, Harren, Chapman, Trachsel



Program of MusicThursday Dec 8th 1904Sgt. Marco Vesella Director.

- | | |
|---------------------------------|------------|
| 1. Wedding March | Mendels. |
| 2. Album Leaf | Wagner |
| 3. Adventure Martha | Flotow |
| 4. Love's Dream after the Ball | Gr. Gullka |
| 5. Ideal Ho - Hum | Luders |
| 6. Chor from Lombardi | Verdi |
| 7. Woodland | Luders |
| 8. Carmen | Pa'et. |
| 9. Soprano Selection | |
| 10. Post & peasant Quers. Juppé | |
| 11. Co - la - la | Fager |
| 12. Soprano — | |
| 13. In a Cozy Corner | Prattan |
| 14. Blue Danube | Strauss |
| 15. March | Vesella. |

The Music (Italian band of 40) was exquisite - On request of "Concing the Viva Hearts & Flowers" was played to Olives and the side -

Love's Dream after the Ball was suddenly disturbed by — a cocktail -

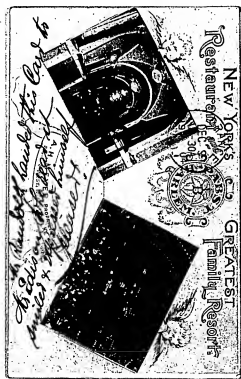
The Oyster marched down - Eight little red-lives to the strains of the Wedding March.

Dishes plopped & turned like Album leaves. (see program)

The strain of Co - la - la came spiritualistically from Chicken Soups, whose body formed the strand of a Financier.

Post & peasant was especially played, as the goddess tested, in a cozy corner - we took decreases, the deceitless.

Then to strains of Adventure to Martha Beer continued to flow - While most brokers present talked laughter & joked & drank!





The discovery of the
Edison Camp!
The Edison Camp works!!!

Upon Tucker should see their
fill-and mend their ways!!

Chapman told of maldesked
chambers of ladies in Eric
Hansen of Kair-gills (Harro!)
& when full & quiet reigned
Chapman woke up to strain of
faunt March - all following that
because, a handsome lady
passing our table, & against
the quiet Chap. cried very audibly

"Grab her! - just! Grab 'er!"
(He meant! the the Chappie)
Water was only once alluded
to, his power falling to Hansen
was in the battle spirit of a
fighting the spirit of his cocktail
& it is apparently to quench
them in Sabal Mordant
exclaimed, that! = "When the two"
Russian fleets find each
other - they have a battle!!"
Judging this remark evoked
from Chapman a Court story

in which there figured a Judge
 lawyers - one Dog - one Chinaman
 - & one interpreter. It seems
 that the interpreter talked so
 long ~~to~~ ^{to} the Chinaman ~~to~~
 and, the question of Dog identity
 was so difficult to establish,
 that the Judge and for testimony
 in short for that Dog, called!
 The interpreter ~~talked~~ for 2 minutes
 & 42 point 0356 seconds & went
 through jaw-ocular gymnastics
 aided & augmented by tongue
 spits & bowel gurgurales (!!)
 sounds. Then Mr. Johnnie Chinaman
 replied seriously & earnestly
 for 3 minutes 10 point 3559
 seconds - & when the Judge
 (having counted 134 figures in
 the ceiling) nearly collapsed
 from impatience the inter-
 preter bowed low & said: -
 It was a yellow Dog your honor.

A number of Laboratory jokes
 passed the line ~~etc~~ for example
 One of the first ~~Flame~~ jokes
 Mr. Deane & 2 ladies sent by Mr. P
 in 1888 to room 12. to hear some
 musical records were shown
 by H. K. Miller - who, on request
 of one lady for some female
 voices) ask Mr. Haugmann where
 he kept some of Effie Stewart's
 Records (then called Phonograms)
 shown a certain box with a
 mixed content, he looked at you
 one for indentations & then
 trying to find them either
 clarinettes or Cornet etc.
 picking up another one he
 felt sure from its looks to be
 a lady's voice - picking it up
 & holding it to his olfactory
 organ he took a good sniff
 at the wax & confidently
 pronounced the words:
 "That's a lady's Record!!!"

Another one:

71

A stranger came to Mr. Edison & told him his battery was no good. it was cheap etc -

Mr. Edison - Why?

Stranger - It only charges a little.

One of the assistants remarks to Mr. Edison - He forgets all about the Fe (see?) (ferum) charge - & Mr. Edison said -

= That's ironic!!!

He also one about Fred Otto's 5 or 6000 tools and the 'one' tool created for the most perfect Mechanism (a human being!).

and a number of others.

Chapman & Miller recites old history from Arizona including a check when broke & its cash after 16 saloons were visited before going to the trading post.

We left West Harlem at 11:45 P.M.
 without incident except that
 Miller & Chapman got conveniently
 lost in the woods of Great Lavender
 down 9th Ave to the West
 To McKeever's pit head - 1-1-1
 Here fine of the Eight
 took their weight.

Raper 155 pounds.
 Iradolf 164 - 155.
 Naugman 266 - 228.
 Hansen 152.
 Warren 166.

One early sees, that, the
 difference between Hansen & Raper
 is 3 pounds - Warren & Iradolf 3 lbs.
 & Hansen being the lightest weight
 he dropped off in Newark onto
 a Bloomfield car without injury.
 While we others tried to find
 & take in Kaiser's, !
 as late as one forty A.M.

Counting out MUCKERS
 Robert Raper & Charles Naugman
 LABORATORY
 ORANGE, N. J.

Business Meeting Dec 18th 1904
the day, same as 1903

Mr. Rafe resigned as Chief Mucker.
 On motion of Wangemann (carried)
 resignation was accepted for Jan 1st

H. S. F. Miller was elected to the
 Chief Mucker for one year (1905)
 Wangemann (Secretary) & Bradlock
 (Treasurer) were re-elected for 1905.

The minutes were approved
 up to date. Motion by Dyer
 to compliment the Secretary
 was carried.

The proposition for a new
 Mucker's badge was laid over
 for the next meeting.

On motion of Dyer - Rafe
 was appointed a Committee
 of one to look after a suitable
 present for Chapman who
 married at 10 - 11 minute
 of January 1905.

Dyer's motion to build
 the treasury for such a

*Wangemann
 Bradlock
 Chapman
 Dyer
 Miller
 Rafe*
 a brave step as a recognition
 of "Yellow" Rafe was carried to
 the limit of \$10.00.

Rafe was appointed a Committee
 of one to look for a place in
 Newark to hold a farewell dinner
 to the outgoing Chief.

The Secretary buying of the
 Mucker Stamp: viz:

MUCKERS

OF THE

EDISON LABORATORY,
 ORANGE, N. J.

For One Dollar was approved.
 Proposals for the next

meeting were

- 1 To admit Mr. Hansen \$15.
- 2 To change the dues to One
 Dollar per month (to relieve &
 simplify the Treasurers and not Dyer.)

Approved

H. S. F. Miller

Chief.

Wangemann
 Secretary.

MUCKERS

OF THE

EDISON LABORATORY,
 ORANGE, N. J.

78 Secretary's notes of Events.

A complimentary letter was sent to Rogers on the occasion of his leaving for Europe Jan. 4th 1905 signed by all the.
A letter was sent to Chapman on occasion of his wedding Jan. 1st -
Copies of both the above are in the archives.
A letter was sent to Chas. A. Fisher pastor father-in-law of Chapman, acknowledging card.
Red Jan 9th card from Mrs. & letter from Chapman only answered the latter. —

On January 13th the first business meeting in 1905, was called by the Solo Clerk in room X111.
Present: Miller, Mangum, Paschall, & Warren - The minutes were read & approved - The treasurer reports that he held no Mrs. Chadwick notes but 245 dollars cash in his strong box.
The change of dues to \$1.00 per month were adopted & a motion (by Warren) unanimously carried that no member was limited to \$1.00 per only & no member need pay anything.

The treasurer was ordered to receive any surplus money ^{as may be offered} (beyond just dues) and to embody the same into his strong box as properly & duly belonging to the members fund.
Mathews Miss Hausch was elected a member of the church the chief casting on motion a single ballot.
Issuance of member badge was laid over.
The question of admitting Albert N. & Miller, Agnewworth, Randol, Paschall, & Warren was laid over to be taken up at a full meeting with the exception that Miller was instructed to communicate with Albert - the secretary's name in regard to Hall. H. Miller.
Our Outing was voted to be held on Febr. 11th in Cape Boulevard & Co. in honor of Mr. Edison's birthday.
It was laid before the members to be considered at a future meeting.
to elect Mr. Thomas A. Edison as honorary chief member at \$2.00 per

The Chief & the Secretary was voted a Committee to lay before the Muckers a revised draft of Constitution & bye laws embodying all changes suggested - also to give power to the Secretary & Treasurer to act in the absence of the Chief.

Meeting was then adjourned -
MUCKERS
OF THE
Jan. 14th 1904.

EDISON LABORATORY;
ORANGE, N. J.

Approved

J. L. Miller
Chief

Wm. W. Mangum
Secretary

Secretary's Notes of Events

Jan. 18th a letter was rec'd from Hansen accepting membership #15. Receipt acknowledged.
Jan. 20th All the Muckers were notified of this.

A Business Meeting was held on Feb. 6th in room 12. Present: Miller, Mangum, Grabel, Warren, Simon, Hansen. The minutes were read & approved.

The treasurer reported on microscopic illumination of the strong box. No new microbes & bacteria had developed nor appeared in its interior! & the "duets" of its intestines were ready to be fed. Kaether J. Keller was elected as #16. Ralph Probst was elected as Mucker #17.

On proposal & after discussion it was voted to change the Constitution so as to drop the clause of newly elected members & sub. stipulate an invitation for others the monthly fee's of Membership to start on the 1st of the month after aresp. Election.

Chief Miller was authorized to find & find out the bylaws regarding joining the Muckers. Extension of Membership to a few old employees of the Edison Laboratory who are not strong. Muckers was discussed, but

No action taken, until the subcommittee of Chas. & Secret. had laid the new draft for a constitution before the Club & they had been voted upon & approved.

It was voted to leave on the 5th D.C. train for a 7th dinner meeting in the Boulevard Café Feb. 11th 1905.

2nd Secretary's comments: the meeting was an active one & the general interest taken by all Muckers present seemed to bode well for the outlook of the Mucker Society in the coming year...

2. We now cheerfully know that the recovery of the Hon. J. Edison after an serious operation performed on January 23rd 1905 is progressing ^{very} satisfactorily!! & we all shall rejoice to

see him well & sound at his old post guiding & directing the progress of ~~the~~ ^{his} Laboratory.

Feb. 7th 1905.

Approved EDISON LABORATORY,
MUCKERS OF THE

J. Miller
Chair.

J. H. Miller
Secretary

Report: Status of Events.

Feb. 7th Postal cards for the dinner were sent to the Muckers in the A. B.

Feb. 8th Recd. Postal from William J. Good Sat. indicating

Feb. 11th The secretary sent to Mr. Edison a boutonniere (White & Crispin) for

& a letter: "My Dear Mr. Edison:

"Early recovery, good health, success and a long life are the wishes for you on this day from

"The Muckers of the Edison Laboratory & send

Feb. 12, a letter of regret of necessary absence from dining was received from Aborgast.

Feb. 13, Mucker #13 celebrates the

50th anniversary of being "Diligent!"

sore eyes (tobacco being both an
 antiseptic & a narcotic stimulant)
 One of the best remedies against
 this eye coming smoke is to turn
 ones back to it & tread stones
 of Manhattan & breeze the
 crown of New York's gutter, and
 rolley along wherever else.
 This we did & the next day my
 house was over shadowed 14th
 street Inferno. - Then I was
 has a magnetic fix to and.
 his grip is as far famed as
 the touch of electricity shock.
 Just ask Dinan - tell the
 us - "Jee - what a fish that
 fellows got!!!" His specific
 makes me feel all right.
 & slowly one simply lets
 him grip, while ones chest
 & shoulders sail upwards!
 He Sails us up to give
 that delectable & Hansen &
 Dinan witnesses Hereto!

Hansen especially who as an old Pal
 claims material for castle surroundings
 with drugs & drugs in the shops
 of - While Sailor Tom it is very
 cheerful his Irish beer tastes
 so, & with great wisdom (based
 on his experience) Paul took
 up the tiller of the good ship
 "Muster" & steered her safely
 past the Alhambra, Hogans
 & other joints into the palace
 here to exploit the aesthetic
 question what becomes of
 "Beer!" Is it drunk or con-
 sumed? & imbibed for
 gravitated into the lower regions.
 Well - the general consent
 was easily obtainable that:
 "Our worthy Treasurer is an
 imbibing consumer who up to
 at times gravitation by per-
 mitting the neglect of lower
 regions in favor of easy
 gentle drink - viz: beer - from
 appears down by the
 glass full it really budged
 his tongue & animated the

Business Meeting was held in room XIII on March 8th 1905.
 Present: Chief Miller, Leo Kauegan, Mrs. Traubolt, Warren, Hansen.
 The secret's notes & report on last meeting were read & approved. — The report of the Treasurer was terse, short & pointed, given after intense & hard work in balancing books in eight words:
 "We, strong box contains between seven — eight dollars!" —! An amazement of four smokers opened themselves in an amazing silence — The fifth (Warren) shouted and all the 150 tin horns in this room vibrated his voice: "Hurrah! Fine Great Doing!" which really in effort seemed but 62 1/2 per cent of the ^{number} of our beloved Guardian of Strongbox secrets, but which in energy contrasted from Treasurer's quiet & hopeless voice like a 262 1/2 percent effort. — Treasurer inferring that strong effort still more repeatful: this included the first

initiation fee turned over to our "finder" merely! (Vic: MORE BEER!)
 Mr. Aglenworth was elected as number # 18. — On proposal for new members Mr. Whiting, Mr. Herth and Hanson were ordered by the Chief to be "rounded" by Traubolt, Kauegan & Dyan respectively as to intentions! Mr. Warren discovered on a convenient stop over in New York a "Polonian" joint in the Italian Restaurant of "Gomparones, corner McDougall St. & after discussion it was voted to hold there an eating on March 24th. —
 Unofficially it was understood that each member should notify Mr. Dyer separately & individually that the legal status of our society, being never in better condition than at present, he need not be afraid of "work" at our next meeting, but he should consider that individually, each member would appreciate getting

if he could attend & let us profit by his sceptile wit during our outing, our eyes fastening the same time on her genial smile in his countenance.

Approved
 Miller
 Chief
 SECRETARY
 TOLSON
 CROOKER
 LORAN
 ELLISON
 HARRIS
 HENRY
 JONES
 KENNEDY
 MURPHY
 ROSS
 TOLSON
 TUCKER
 WATSON
 WHEELER
 WILSON
 WOODWARD
 YERGEN

Secretary notes of Events

- March 9. Rec'd a letter from #17 regarding getting them
 " 9. A proposal to admit old Muskers under some title or device which would cover Muskers previously at Liberty to 1902 was made to the Secretary.
 March 10. Details of visiting March 1st sent to all about Mr.
 " 20 Rec'd letter from Harry Francis (assumed!)
 " 22 Suggestion to pass a resolution to ^{renew} the principle of reading of past minutes to ex-members who visit the laboratory or are named as past.
 " 23 Had visit from Dr. L. R. Plan and (Richard) Had about an hour of the Lab. he was here in 1899-91 on the top Kennedy.

Parting March 24th 1905. Talk about the weather! It was not a circumstance to the smile of the "F. F. F." in heavy smoking skin from penny to 5¢. H. Umbrell and greeting the day at the door of "Superior's". "Has any one been shown up?" "Well, no." "We are four any way" a regular button, much covered clover leaf! Once more the wouldst the F. F. F. under the thumb by a few drops of Angustura bitters, mixed with plum juice & an olive on the side as a charmer. No corner #12, now dignified Professor at the New York University of Organic Chemistry. This time answering the query, "How's the little babe?" was very unprofessorlike with "laamie paine of syllid & chin: "Thiel one!" "The Rasmoff are people indeed & vary their outposts for this time we were told" into a "By" - Next came "The Man with a bundle" a good old "Chap" - looked neat & well groomed our prospective #19. No

Gourides Whiting who asked the gentle
when in half position of between
standing & sitting: "Gentlemen,
Can we have, what I want, to do?"
Every one smiled & recall: a repeated
(cock-tail!) We were grouped.

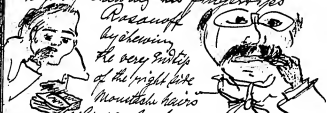
Charles Beaupré Chapman

Moving ground for prospectors.

Whiting

By general consent the prospectors
passed over to Chapman & Beaupré.
We marked their interest in its contents
Chap by chewing his finger-tips

Beaupré
by showing
the very white
of the night side
Mouthside hairs
which is his favorite unconscious
occupation when receding and the pro-
blematic status of presenting
themselves as fine rolled by.
A Bohemian dinner in an elegant restaurant
would be incomplete without French Whiting



x. Swiss "Gardes" who as first course
set before us a Norwegian version or rather
3/4 of a sardine & 1/16 of a Lemon each on a
very small plate, (the balance of the sardine
was broken off, as it would have lapped
over on the rim of the plate) the sardines
went down without any accident, while
querry & stories passed back & forth - and
in a momentary silence #12 smiled still
chewing Mountains hair (not sardines!) #11
"Dirty good lies!" #8 - "it's all lies!"
#10 - "Salt it down". While 2, 11 &
prospector 19, was reading the extraordinary
american faculty of producing
"Mitre" out of a by-product of human
manufactured steadily in rippling
streams by mothers, sweethearts, wives
& babies to help along the "Cause" in
an emergency of rhetorical fighting
which made the whole position trouble
for four years in Union & Rebellion
at the same time - While I said
The #12 passed to the other members
on enlarged Samoan Photo Computing

that the Korean st. photographs #4, #11. In large
 "Anything" 5 for 25 1/2 #2 got ~~nothing~~
 further, for his money struck him dumb:
 "Guess I'll postpone 'em; I got a feeling
 for a family salary & I can't cut salary."
 "Wants cheaper than that." 9 3/4 #12
 again reflectively stalked about his
 place "while the orchestra plays" but we
 = Do it true!! - Up came the
 customary claret - some one asked
 I wonder if this is 8 per cent -
 #13 noticed! Yes! 8% claret, he said
 is something else! - Next soup.
 & the party grouped
 + # 10 & 12 exchanging confidences -
 + # 8 & 2 reading -
 # brood 19 listening to our learned & earnest
 # 15. & # 13 mixing his young ^{stomach} its
 get the soap & pine oil taste of
 his clam chowder soup! - which
 all present on sampling pronounced
 to be a success. Chapman ^{later}
 what he said when remarking I
 gain 20. to since my marriage

but he looked disgusted when shown
 by mathematical calculation
 that by Sept. 1st if the increase
 keeps up in the same ratio
 he would look like 229 lbs!
 To which Warren trying to enjoy cigar,
 with smoke longingly intervened;
 I wonder if they'll smoke me out if
one smoked a pipe!
 Fish (Cohad?) next & everyone
 successfully got ash choked by a fish
 bone - Mrs Chapman's health having
 been wound in "red ink" Mr Chapman
 charmed all present by a message
 saying: Mrs C. ~~thinks~~ wishes you to
 set a date near April 15 to ^{be} ~~have~~ &
 when you all can come to the
 christening! to 528 Rattus Ave
 Myrtle beach (N.Y.) ^{Wain} L. drops placation
 one look to left, & down to left, & starts up
 by christening to explain, & ^{had} ~~some~~
 to be anxious - - to baptize
 the "potatoes" given them by the Musicals
 & the Musicals to "Catch" & "Contented."

Universally accepted & it was
motioned, seconded & carried
by vote 6 to 1 (Chapman dissenting)
That poems of wit & common sense
& all other should be left alone.
Fraudall proposed full turnout
Warren chimmed in "but don't turnout
full. # 13. If none does he's out a
full turn."

Seriously a suggestion was made
to put in by-laws that the chairman
at an meeting at will should order
any two present to change seats
in order to give opportunity of
present & remarks to have these
delicious little heart-to-heart talks.

"How do one spaghetti?"
and Warren proceeded in this way



making sliding
the juice of the tomato
the deception of the warmth
of the cracked worn
Italian
spaghetti party!

(Name & family not given in Linn's
Botanical Dictionary!)

Roast chicken & salad were
good & we now enjoyed a
street of unblemished stories, jokes
& anecdotes of which I have
record! — Book # 1.

The usual, customary, remarkable
status & omission, for once black
on white, for once attackable, to be
put in strong box as a horrible
example was served on us:
It read: Very sorry can't be with!
(second line) you thought I had regard
(third line) to all Frank & Dyer.
You may not think that funny, but that

but just read the three lines
distinctly & separate & you get.

first line = What Dyer can't be with
he got to be without = He was!!

Second line We do, we did, we
send eleven postal cards one each
to each about duodecim & duodecim.
worth pretty too! We swear to it,
because every head & signed them, &
we know, we did the second line!

Third line is undoubtedly a slight
th. operators mutilation, as Dyer
generally is a model of modesty
& circumspection, and even as
the telegram seems to have it
"General" (or "common") flat,
never mind Dyer, we all were
glad to have you remember me,
& the fact was advised to thank
you for the spirit of your instruction,
and to convey our appreciation to
with the distinct promise that at the
next meeting you'll be with us &
~~stay~~ - but that you'll be there.
& not only as a delusion & a snare.

by getting giving us telegraphic help! 101

#2. Mr Edison's story of an old telegraph
operator, a crack-a-jack at that named Ruger,
who was working with Central N.Y. R.R. Co.
was hard to beat but had had habit of
working 4 days then he would for 4 days
be a regular tober & get drunk. Had been
on & off the Road innumerable times
& asserted manager for a job. He said: "I
we can't put you on again!" - He gave
me one more trial - No! - Just one
more! - No, he said! - Lay off!
I can get the job in Cairo, give me
a pass there & I'll be O.K. - No can't
do anything for you - but a pass
cost you nothing & you know I am
a first class operator & in Cairo is my job
a- waiting - No we can't do anything
for you - Well then gi' me a ticket
so that I can saddle you said - Trains
B.R. since that after when going
as a tober used to borrow from Cairo,
here, there, everywhere - Once because
to a equal station broke & getting
to talk with the operator ultimately

102 asked him for a couple of Dollars
 the operator said: Don't know you -
 Bogardus - let me have the key of
 telegraph instrument & I show you all
 along the line who I am - No -!
 can't even then give you mix. Don't
 know you, never heard of you! -
 Bog. "Never heard of me?" *After this*
 you must be a hell of an operator.
 #4. Brian had night shift. Day day day.
 One night he came in full as a dick
 picked up an axe handle, paraded the
 stone pipe, knocked in the door, held
 down fire alarm & demolished
 instruments - when through he
 went into hall cupboard & smashed
 the batteries & went out. Brian
 fixed few wires to operate with &
 reported in the morning to Manager.
 He looked all a - flunk for few
 moments then said, if Bogardus
 does that again - by Jove I'll
 break his spine!

#5. In Brian often told that they
 operators in the time become
 mere machines so far as men,

of words are concerned - & they are. But mechanically letters after letters
 went after words. One operator
 received important news in a telegram
 for himself. He went through the
 regular routine, sealed & addressed
 Envelope - it was sent to his house
 & he found it there when he came to
 his supper in his own handwriting
 to his own great astonishment.

#6. When in Cincinnati Brian
 received the word over the wire that
 Lincoln was assassinated. Brian
 got later forwarded it as addressed &
 received the news in the regular
 way by newspaper extra & when
 in the telegraph office they looked up
 who received the news & did not find
 it among the operators - the words
 were in Brian's handwriting.

#7. A man had an immense appetite
 & on a certain day & at week his
 col. man cook had 2 chickens for his
 dinner. One fine day the Master
 found only one on the table.
 He called the cook where is the other

104 Cook - that is the other! - I've
#8. Always eat one & part of another
where is the other? - Cook: that
is the other - I have eaten the first!

#8. My #12. Professor was standing
on a spring board over a lake &
watching & counting the rings in
water from dropping stone to go a
certain distance. he got interested
& on the 5th or 6th drop he dropped his
watch instead of the stone.

#9. Prof. Sylvester of Hopkins was as
a favor asked to give his lecture
at 8:45 instead of 9:15. He agrees.
Note a colleague who wanted to take
a certain train - Sylvester had
a surprise to a minute & that
knowing everything was 1/2 hour
earlier - He got madder & madder
& when on his way to college his anger
increased every step. In front
of the university there is a ~~large~~
monument in 2 small parts
with circular path around the
monument. The students from
the window last seen go around

that monument like a circle of
horses in a ring - One of them
went down & said - Where are
you going Professor? - he said
I - I am going to my lecture
1/2 hour earlier!!!

#10. Prof. Stadler spent vacation
in London & then back in 4.4. Vienna.
He was going to explain to students
some point or another - When
lecturing the last horse would
make him stop & account at the
Professor - He began the sentence
"When I was in - in the
insane asylum -" "Ding!"
Down fell a book on the floor
Prof. - scowls - a voice called
out: "Halt! You out?"

N.B. #8. 9. & 10. in quarantined time by #12.

#11. A victor watched in dream
the exercise of inmates who laboring
some light, some heavy loads and
had wheelbarrow upside down. He
watched the latter fellow drop out
of line frequently & when all had
made 7 rounds the latter had made 6.

he stepped up & asked 'what do
you do that for & the answer, 'Kiss
m' m' m' me & I am crazy!!
& when I put the barrow right
up - they'll hit it with bricks.
'On me!' 'SEE!!' 'sh - sh - sh!!'

12 (True Story Chapman) a drunken
man asleep in 'Frolley Waul' was
suddenly raise his arm & toward the
conductors would stop the car
case the street & the conductor asked
his head - had happened 3 or 4 times
& the Irish conductor stopped up
to the man & said: 'What strait
do you want? The man said
'What strait (Monday) have
you got?'

13. Chapman had been sitting in
his thought, his eyes looking in big
blank space, but now came back
to earth & said I had a good joke
in mind to tell next, but since
my marriage I lost my 'Memory'
(Poked a changed man!!) but he
continued. Here's another -
Travelling in the Wild, Waddy

speeding along a bare cut ^{up the} ~~up the~~
a pullman, puffing around for
good or sweet things and eventually
slid into a berth & disappeared.
Later the train slowed up &
muzzlingly looking his shop
left the train whole near the
birth could grudgingly be heard
the words 'If you were a gentleman
you'd have taken off your automobile
13. Listening to this story & wanting
to wash down the taste of the --
- gongaxala butter real pepper &
black Amburman took the red ink
bottle & filled his -- 'Cup' instead of
glass. - The Treasurer # 10. had
long been giggling in his pants
pockets what may have been either
keys or cash - & kept on smiling
& giggling for 10 - & behold! before
the speaker for the whole evening
including the Musicians & program
treats figured only \$3.40 for me
had 40 pins & Corral a fence as
good for 5 pins (or less) & around
at last # 15 was heard from:

108 in joke # 14. Child said "Ma,
do I look like papa, ma?" (Ma said)
Don't know. Only met him once
at a basket ball party!! but
come to think of it some one else
said that joke, so getting appearing
a glimpse of a possibility of
Catching Chapman's loss of
memory, the Secretary stops right
here telling all further jokes.

We remembered all about
Muckers & left about 11:15 P.M.
in a splashing rain & broke
up to go each our different
ways. The adventures of going
on his way home will never be
told! Rosanoff probably chewed
his left moustache all the way
home, during recital & listening
to his wife, never stopped even
when he kissed his garnet
& B. & only stopped telling
silly things of the past
times when boiling Castalia
Cax & Starie said with Mitter
of all sort of oils - I suppose

Olive oil used in cooking at 400.
Goussarones gave by the aptitude
the neighborhood.

Orange was reached by the
amarette at 12:25 after Hansen
had calmed down from listening
to incoherent remarks of a
drunken man back of us sleep
in a seat who winking one eye
would think aloud in German.
They were unintelligible to the point
to Warren but hypnotized & charmed.
On the whole the evening could
not have been more enjoyable
now.

approved
J. Miller
Chief.

MUCKERS
OF THE
EDISON LABORATORY
ORANGE, N. J.

Secretary's notes of Decrets.

April 7. Quakers 19 & 20 were notified
of their election.
April 7 wrote Chapman he would
come April 15th
April 8th Letter from Chap. crossed
oily.

A Business Meeting was held in room XIII on April 6. Present: Chief, Secretary, Treasurer & Hansen. After concerning in all deliberations the minutes were read & approved up to page 109. The Treasurer reported cash \$8⁰⁰ not including the delinquents (March is not paid up!) looking over the brim of his glasses at the empty chairs.
Dr. Hitting was elected as \$19.
Dr. Hitting as \$20.

The thinking caps of the Muckers were set into motion to think up a name for former Muckers previous to 1902. Who may join our association.

The request to have all outings seats changed occasionally as ordered by the Chairman was carried. ^{The Secretary has agreed to give} April 15th was set for the day to visit Chapman's better lab to christen the Pitade

given to "him" both 3 months.
Approved
J. V. Miller
Chief
EDISON LABORATORY,
J. H. Thompson
Secretary

Secretaries notes of events.

April 12 Received Chap's letter approving 2c
April 15th & sent postals to all Muckers.

A suggestion for name of all Muckers: Associate Muckers:

April 14 Received letter from J. S. (St. Kensington) Ragus.

On April 15th the Secretary, Treasurer, Hansen, Cowing & Hansen enjoyed a call on Mr. & Mrs. Chapman & duly christened the Pitade in a Lemonade fruit punch. The doctor's prescription of "Ragus" after were not neglected. The evening was most pronounced a success.

Approved
J. V. Miller
Chief
EDISON LABORATORY,
J. H. Thompson
Secretary

Business Meeting May 16th 1905 in
room XIII. Present: Secretary, Treasurer
Warren, Fausen Ogilworth.

Secr. report adopted. Letters of Refusⁿ
Aberington read

Secr. report adopted. Letters of Refusⁿ
Aberington read

Shasener reports \$1300 label, with out
standing due \$3100 in Hong box!
Algeron J. Siebert was elected as
#121.

Our Christmas is to be held at Palace
126th St. Friday May 19th at 4:30 P.M.

Speaker Paahoot in well chosen words reported his sadness to be Van.

to lay down the office of Treasurer
as his Mother needed him home

He would leave for Norway on
May 24 E.O.S.

The muckers loose thus their
first treasures, who by every
one.

All will join in wishes for his
further progress in life! Success
& good health may be his!!!

On motion of Treasurer he was
was elected Auditor of his Strong
box-accounts to receive all

Documents, etc. pending the
return of Chief Miller from Canada

Whiting & Kaugenain were appointed
a Committee to select a suitable

moments (Hansen part it momentum?)
for Gravel etc. (inside of from 7 to 8' 10" - 8)

thicker Hansen (who will leave in
1 or 2 weeks!) to receive a present also
to R. P. [unclear] [unclear]

to be from 3 to 600. & both of
have a ^{parting} resolution signed by
All 33

the Muckers. 5.
approach. MUCKERS
Stim. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 841. 842. 8

EDISON LABORATORY,
ORANGE, N. J.

May 17th The secretary submitted to Mr Edison the Local Ho. for 1888.

value highly for him to head the list
of Muckers & K. E. ^{State} Sub. 1899 \$500

for this purpose.

May 19th 1905's Outing to Pabst
 started for some at 8 o'clock, others at 7:15
 but for our slick & well groomed
 hair, it was representative of the fun. 39
 commenced in the female rec lounge.
 As a shapper or dresser Knicker
 he has his initials well chosen =
 viz. = A-K-W! He sees & he went
 the limit & on Hansen's brush
 (silver mounted by Johnson) he inscribed
 & on Traaholt's mug (silver
 loving cup - good for anti-nuptial
 drinking cup or a post nuptial
 milk locker for a prospective first born)
 also from Pabst (H.C.) a suitable
 inscription (\$4.00) will be done free
 of charge! Well - in side alley
 - Crockett's menu in order and again
 finally we settled down to the
 dollar dinner. Name spoke as
 per page 59 - only Traaholt's play
 shade had been removed.
 present: Secretary, Treasurer, Hans
 Hansen, Whiting & Clousing. Our

Maustake chasing Professor's
 dropped in to say sweet whispering
 to Traaholt & Hansen & to console
 that his "garrule" was sick and
 he could stay but a minute. When
 seated ~~stood~~ for an hour. We re-
 membered all absent members
 & EX-100 by the usual postal card.
 The evening was a thoroughly
 enjoyable one for every one present
 & both to be remembered. Laughter &
 jotted to their hearts content. Offer
 an excellent meal for desert & 19
 produced a parcel which, handed
 with appropriate words to the outgoing
 Treasurer was by him opened &
 contained - for him and for
 Hansen 3 each "McGowan".
 Salted bread rolls as taken with
 beer in Dutch restaurants. After
 the coffee the Secretary addressed
 both G. & F. & presented them with
 the Memoranda of our Association
 Traaholt - a silver loving cup! -
 Hansen - a silver topped brush!

116 both suitably engraved by
the Johnham Mfg. Co. And here
it were the unexpected happens
Hansen the taciturn the half-forgotten
waxed eloquent in praise of the
laboratory, Mr. Eriksen & Mr. E's
work. He praised the highest fidelity
to his indefatigable energy &
perseverence - to his resources,
his power of deduction - his
great memory & his modest
easy way with the men great
employer & engaged with him
Hansen compared him as
second to none living human
in sterling qualities such as
were necessary for his work
his greatness of perception
& his happy temperament.
- etc. etc. The secretary
wished that a stenographer could
have been there at that time.
But - alas - ! -
He then wrote a few words to
Mr. Eriksen to be mailed.

and in happy whirling about
the town till 11:20 P.M. concluded
the dinner. 12 o'clock. Dr. A.
P. Dickerson & a partying drink
to the health & welfare of the
parting friends.

Next day Mr. Randolgh showed
letter to Mr. Eriksen, who smiled
& felt pleased reading it twice
over. To Graahol he remarks
Why don't you get all the former
Muckers to join. You then
would have an association
& imitating the smoothing of
gloves on two fingers continued
6 or 7 of them are pulled out
& dashed! - Why don't you go
Hansen to the farthest North West
approach

Johnnie
MUCKERS
EDWIN L. MUCKER
ORANGE, N. J.

Secretary's Note of Events!

May 24. Paalbol & Hansen left the Laboratory. -

Paalbol was seen off to Europe by Secretary, Hansen & Wiersma.

May 27. Hansen was seen off to Europe by Secretary. -

June 13th Hansen remarked long time between Dr. Ks - Can the Treasury stand an Outing. -

Business Meeting June 19th 1905.

Present: Chief Miller, Deas, Hargmann, Dyer, Wirth, Siebert. -

Minutes approved & read. The Treasurers report read & approved.

Alb. Wirth was elected Treasurer & also to be Auditor for accounts from May 20 to June 19th.

The Treasurer, Hargmann (B. 189) was accepted. Letter of A. L. O. was read & the Chief

Authorized to clear up the misunderstanding about

initiation fee (A's acceptance having taken place after the vote of on said fee, while his joining was agreed on before said vote) & to settle the matter as we all want it to be with us. -

The question of next meeting was laid over for two weeks. Opposed.

W. Miller, Secretary, EDISON LABORATORY, ORANGE, N. J.

Secretary's Note of Events.

June 19th Chief Miller from Charleston, Christiansburg and Norway. -

July 4th No. 4th Celebration was held by the Mechanics. The

prospects for a short time in this Klatter Locom are multiplying - owing to absence of Chief we will have to hold it without him & all the other absentees.

Short business Meeting was held July 12th 1905. Present Secy, Treasurer, Warren, Whiting, 1 room 91^c humidity 85. The date for next outing was set for July 21st. The Secretary to send notices to (either Hadden Island or Bayou shore dinner) to all Muckers. & X's. The Treasurer reported \$3.62 Cash & \$21 outstanding.

Whiting's proposal to have the Treasurer to insure his appearance at the dinner, was laid over to a future meeting.

Approved: MUCKERS OF THE
EDISON LABORATORY.
 Chas. Minor W. E. HOLLAND

Secretary's notes of Receipts
 July 10. Tablets were paid to Dr. H. S. Not. Fred A. C. Howe chemist in bond 3. That Muckers wished him to come to the dinner July 10th. Mr. W. E. Holland was also notified.

Outing July 21st 1905. To the new formal Restaurant (lady's omitted?) was a most enjoyable affair. Present Sec'y, Treasurer, Whiting, Warren, Liebert, Cowing & the new Chemist - "Howe". This time we all left in a bunch except Warren. We waited on the train that the Master of the Hudson ripped ^{me} up. Took the ferryboat to the pier & a fine cool ride to George. We had the Casino table of the Molokini pier, piazza & Ocean breezes by way of the narrows. Cooled our brows, while a well prepared French repast was gradually, slowly, but surely disappearing into our "minds". Various were the drinks from Limonade to Whiskey, from weak slant to Sherry & Scotch. The conversation was animated. Each one contributing good plenty of pleasure for the others. The usual carts were sent to

122 the X-muckers and mailed
in I. Island. After the dinner, we
strolled through the rooms and
having had no music so far (and
#13. was made to tickle every
A happy crowd of pleasing
faced ladies gathered round
the piano at table in inner
room & outside on piazza. The
program given was to be true
& little classical, but that seems
what every one called for & wanted.
We met Mr. & Mrs. Churchworth of the
Wentworth Co. & up to 11:35 PM
enjoyed many a happy draught
of various denominations
(a splendid cool very nice gave
relief from the hot day and
by 11:30 PM. we reached again
the 12:30 Del. L. for home.
On leaving the Laboratory
Mr. Edison sitting in his
favorite position on the
Grand Stairs Main Entrance
said = You go to far off.

If you go nearer I'll find 123
you next thing. Take an auto.
mobile ^{my car} for a dinner
that's were you get cool breezes
& pleasure out of a ride.
We hope Mr. Edison will join
in our next packing
approach
Miller ^{INDIANERS}
Chief. ^{EDISON}
EDISON LABORATORY
ORANGE, N. J.

Secretary's Note of Events.
July 28 rec'd letter from Hansen
pleasantly acknowledging receipt
of S. I. Card etc.
Aug 7 Isaac Holt wrote Norwegian
postal that he met Rallantue
& was off with him to Dunderen
(Living from quarrying, broken down)
July 30. Rec'd letter from Harris -
Sept 6th " " Isaac Holt who
died in blue eyes waxed & waxed
Sept 7th Rec'd Card from Raper
also from Doc Reas.

A Business Meeting was held September 19th 1908 in room 511.
 Present: Secretary, Treasurer, Herbert Warren, etc. The Secy's report was read & approved. The Treasurer reported Cash \$10.25 due \$17.22.
 Elected were C. Wurth #22. — W. B. Holland #23. J. V. Herman #24. — Warren & Waugman were appointed a Committee to arrange for date for an Octy in Paterson next week. Dr. Egan had previously promised to take part in this Octy which was to be an Anti-Viv. The Secretary was ordered to invite to this meeting Mr. Davidson of Newark also Fred Ott. (if he goes with us in White Island & Bachman & any other party who may be a prospective Mucker. So Whiting was appointed a Committee of one to procure designs & get prices for

a mucker's button to be laid before a future meeting. It was proposed to send the Muckers in regard to paying say 50¢ or \$1.00 a year to cover the postage of notices etc. It was agreed to adopt the title of "Associate of Muckers of Wyman Laboratory" for such who had been formerly Muckers & Experimenters in the Ed. Lab. & also for parties who are influential & hold high positions in present & future Wyman Company's. The names of McIlwaine & Weber were proposed as Associate M. & The meeting then adjourned.
 Approved
 J. V. Herman Chief
 J. W. Waugman Secretary
 Secretary's Notes of Events.
 Oct before above meeting will

126 waiting for our Chief the following conversation took place
#20: Helbought to have a secret handshake

#8: Something like this:-

Imitating a position adopted

#20: That'll be nice for the ladies

#21: Just hear that! gently pointing to #20 & 8!

The meeting was held not post postponed for inability of most members to be there (only 6 out of a possible 16) and mostly so Mr. Spoon could not automobile in the great cost of today. So we adjourned. Dr. J. H. French, 236 Market Street, Secretary Notes of Meeting
Sept 26, 1905. Names 78 left the Laboratory
Chapman came out to say

Chief & Secretary did the honor to let the Hornplace Orange.

Suggestion to have a photo on file of every Mucker in a special book with signature of each

Oct 24. 05. A business Meeting was held room XIII. Present.

Sec'y. Treas. German C. Wurth
Dyer (pr.) Richard (pr.) Holland (pr.)

Treas. report read & approved
Treasurer reports cash \$13.68 Due \$27.00 total \$40.68

This is the high water mark for the Strong box. Outing as before \$15.00. Will be held Friday, Nov. 3rd 05. The day was authorized to make all the necessary arrangements. All other business was laid over to next meeting.

approved

J. Miller

Chas. Mc

MUCKER
ON THE
ED. H. MUCKER
N. H. MUCKER
N. H. MUCKER

128 Then the 6th train reached New

13, 20 & 22 were joined by 21, 22
& 19 & also invited guest J. M. Lundan
& we proceeded by way of Messengers
& 6th L. to what proved to be the most
payable Cleaving on Nov. 3rd at
all Dated Harland 12.5th H. Hall.

8. awaited us & # 9. closed up
after the Treasurer gladdened the
heart of Messengers # 10 & 15. We sat down
Nine strong having enforced our
spirits at Downtown Bar, where
naught was barred except evil
spirits. The meal was excellent
the manager adding 1/2 bottle
claret or white since our last visit
to the 2nd dinner. Right from the
first movement an excellent force
spirit manifested itself, which
grew under the strains of our
old friend (see page 58 & 72) Villa's
Ball. Again they rendered exquisite
Italian Melodies with rare
precision & artistic finish. I felt
one heart be lifted from one

again values & overtures 229
Harmonies - the line they drew
on Wagner's & bully that was, for
the light living Italian, but barely
wishes for the fugues & intricate
beauties of an finished grand
Ensemble of Northern masters. He
prefers the light running brook
to the overwhelming thunder of a
Niagara down pour. Miss
Heltner (a year old friend) and her
Luci Orjuno soloisted and she also
had Piquette duarte & a trio by
Brass efforts & the Trombona
especially inclined towards



the play (or proof) ourselves
He then deliberated up
to the matter of the
Beaux Arts. viz poetry
and sketching - The
Ball started rolling by # 24th
assigning & expressing 'parody' on
'Everybody's Brother' but rather
introducing 'Ma' & 'Daddy' Aim
to show what they did do & can - do

130 next came picture of Maule Park orchestra depicting one Dan Enha, small combed, flamboyant and intense leader. — The muckers heard the stage was augmented by an X mucker, who some thing like this:



Next the official photo depicted in an elaborate ballet of a bowing dancer to a "Rude, the Slave of the old apple tree" — Four types of muckers representing "The Olden Kabalet" & "So" surrounding a flame crank was excellently portrayed — a leading ladies view (Correct perspective) of a stout woman in parquet as seen from 1st balcony was very funny "Dr. Koltz" & Halvan Vanover's class some next the pipe dream preceded the choice: My Western choice and so they alloted six on

immenseable jokes & 131 side plays were enjoyed till 11:30 P.M. And after all knew & some X.M.'s relieved their conscience by having every one drink & imbibe to the health of someone else, we remembered gradually the "Peruvian no. venient"! Caring's coming to greet us in flesh & rain was duly acknowledged. Once the "Lagos" (hand) played "Tammam"! well noted to be the order of the day. The ex-muckers here postulated as usual & the Ex-muckers address by letter: "May success crown your untiring labor, energy and may each be yours to enjoy that success. Lander was in his element — and enjoyed the eve. He called in "Lakeview Ave Draft Artists let loose" but was very careful & chose to play with Warren & Cawling instead of coming home ward. He "Braz" a red haired dream buzzed &

Approved: *[Signature]* *[Signature]* MUELLER
Special Agent in Charge
EDISON LABORATORY,
ROCKY HILL, N.Y.

Secretary's Notes of Events. 133

Nov. 7th Card received from Rafn. - Berlin

- 8. wrote to Trakloft & Rafu.
- 20. Rec^d Postal from #15, also address of #10.

Business Meeting Nov 28th 05.

Present Secretary. Treas. 22. 23. 24.
proxy 11. 16. 19. 21. absent Two Muchkin

The Secretary's report approved, the Treasurer reported Carl Anting's arrears \$14.95. - Dues uncollected \$25.00

cash on hand \$11⁵². - Next Outing
was decided to be at Houquins in
6th Ave 28th H. Thursday Dec. 7, 1905.

Elected were as # 15. Rob. A. Bachman.
as # 26 Louis Ott. The names of

Mr W. G. Bee & Mr Prodie were laid over to next meeting. It was decided to

ask Messrs. Bee & Brodie also the
Chemists Foster, Dr. Frothe and

Presley [here now for over two months] to join us at the dinner.

under our usual rule "at their
own ^{each} exp. Expense!"

At Motion of # 24 it was voted

To supply 12 clay pipes and a package of "Honest" Smoking Salt, to for the benefit of the Muckers who attend the Business Meetings.

A rule was adopted, ^{forming} to a waiter's attempt at waiting.

Nov 3. To collect a check for \$1.69

3 Times from Quakers & Ex-Muckers

That hereafter all disbursements at ^{proper} Outings are to be made by

Our Treasurer, who will note

the amount due for expenses

from Ex-Muckers & other atten-

dants & collect the same

from them before their departure.

Dec 23 & 13 were appointed a

Committee to notify the above

Quarrel of our request to attend

the dinner and the Secretary

to circulate among

members the result of the

arrangements made at

Morgansville.

N.B. The above adopted rule was

not meant to be a 'gag', preventing
'to eat' before or after our
Outings or even during the
saule! —

Approved! — ^{Max Abraham}
J. Miller EDISON LABORATORY,
ORANGE, N. J.

Chief Mucker

Secretary's Notes of Events.

Dec 12. Sent out all notices for Dec 7th

& make longinus arrangements.

Outing Dec 7th 1905 to Longinus

The Chief, Secretary, Treasurer, #9, 19 & 22

were joined by 23, 24, 26 and two

guests Chemist, Brother & Brother.

Lawden & Family, Brother & Dec not

showing up. The 'Repack' was of

the best, do we set there from

8 to 10:15 munching the delicately

prepared dishes courses of

soup, fish, steak, Caban and our

daintily prepared & served the

Muckers enjoyed near the head

of the table the presence of the

136 a good Orchestra close by
was followed by Neapolitan songs
& Louis Languin from the distant
ministered to our wants by
few French directions spoken
of, on to the waiters. The ice
Porton smelted of far away
Paris & the Coffee had the Paris
aroma. Even on our table
Dr. G. etc introduced the Cockney
litan by jabbering English -
French & German. His attack
at translating jokes vibrated
our laughter as often on
the lower half of the festive board
while 22. 3. 19. At 9. 9. had
their heads closely together
for minutes at the time &
to only relax their bent
back muscles & throwing
their heads back 'Roared'
Well the lower end of the
table could not well justify
the propriety of subdividing
told jokes on account of

the proximity of easily 137
choked French ladies - so for
once he miscausally he,
alighted that the Muckers are
growing! A big round table
in a separate room would
have filled the place & but then
not have given to us pleasant
spout hours. Mr. Ellison and
Et M's & absent ones were
remembered by usual cards
& letters. From 10³⁰ to 11⁴⁵
£13. drummed on a veri-
tablement piano ancien.
His music of & on relieved
by a charming Russian voice
of a set of 'Nobles aka Dimes'
(next table to ours.) Mr. Quinby
was the Juts name (University
Club Man!) Coffee, cigars, cor-
dials & confusion of voices
the great 'C's of French
made the occasion a memo-
rable one for us all. The general
concensus being 'Great Success!'

138 The most marvellous in-
novation was the calm and
dignified Mien of One beloved
& "carefully" guarded Strong-

-box-keeper: Well - \$1.00 per
plate - 4 for a dollar cigars
- 20¢ & 3 for a half drinks -
phased him as little as
formerly a 5¢ Conney Island
skeoner would have disturbed
him - "Progress" was dipping
on his pleasant brow - for
he had & he knew he had
the "Goods" on him and
not one of us dared think
where did he get it? - Mr
Strong being told of our
outing & hearing of the
\$1.00 plate said: "Reckless!"
You're getting reckless -
And low & behold even
that expression of our
beloved Master muffled
not the placid & calm
conservation as he of

the strong box "indian" 139
fashion greeted by raised
& high upheld hand this
Own Warwhoop

We've Got it!



the Inquirer send over
to Mr Strong the best box of
"Camembert 2 crackers & 4
toothpicks - which at the E's
request were promptly send
up to the house -

A "Minut" (as the French
say) we wrapped the 6 Ave
car to 23rd & for the latter
homeward - All pleased
all had hoped to add another
pleasant memory to each
& every one present!

approach

William

Chief

MUCKERS

OF THE

EDISON LABORATORY

ORANGE, N. J.

140 Secretary's notes of Exco's.

Dec 15th Received letter from #1, ^{Letter} Duty, amount
Election for 1906.

A Business Meeting was held
Dec 26th 05. Present Body Treas. 22, 23
16, 11, 18, 19, 16, 24. The letters by Henry.
The reading of minutes & the financial
reports for 1905 were laid over to
next meeting.

By general & unanimous
acclamation the present Officers
as a body were re-elected. By
#22 casting one vote.

Election to membership were
#1, #9, Dec as #24, and to
H. M. Brodie as #28.

#19, going away shortly, the Secy
& #23 were appointed a Committee
of two to select & buy a suitable
space for not to meet in next meeting.
Approved.

Minister

Chif.

EDISON LABORATORY
OF ELECTRICITY
NEW YORK

1906.

141

A business meeting was held
in room XIII, January 23rd 1906.
Present Secy. Treas. 11, 16, 18, 22, 23, 24
25, 26, 27 (Sproing) Secretary's report
was approved. Treasurer's report
Cash \$7²⁵ Over \$34⁴⁵ was approved.

The next meeting will be held on
Feb. 1st at Conjarones 8th St. arr.
McDougal N.Y. City. Invitation are
to be given (by #26) to Dr. Foster &
the 4 Chemists, Greenleaf, Forward, Thayer,
& Foster (by 20) to held (by 22).

The redrawn Constitution (as
approved by our most eminent
Council, #11.) was laid before
the members to be voted on at
our next meeting.

Approved.

Chif. M.

MUCKERS
OF THE
EDISON LABORATORY
OF ELECTRICITY
CHARGE

142 Secretary's notes.

Dec 29, Island K. paper announcing
the death of Our #5, after a 3 day struggle
from appendicitis - three lives
now in our memory only the
remembrances of a young, able
experimental student, who was
like a friend of good cheer at all
times when each one of us
met him. - Our #5 is the
first one in our association
to go this last, to the eternal
Country - Number in peace

George F. Hetherington, aged 26, for three years a resident of the Orooges, died after three days' illness, from appendicitis, at Ashland, Ky.

The Muckers Association of the Edison Laboratory and his many friends here will regret his early death. He was a bright and capable young student, an experimenter and worker, who in life was a friend of good cheer to everyone who met him. He was the first of the "Muckers" to go to the last—to the eternal ontog.

Orange Advertiser
Feb 2nd 1906

At Our Antient
Feb 1st the Members
Drank to the
Memory of
their departed
Friend and
former Jo Worker.
The Secretary, Mr
ordered to send
works of Providence
to his Family.

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[10]

Dinner Feb. 4, 1906 to Conference
Present # 13. G. P. 19. 20. 21. 22. 24. 25.
46. 27. 28. 29. & 30. Gable. to Louisville, Kansas
(Cheminist). The table divided in 4
East x West side who fired several
jokes at each other, Dinner was
excellent x music quite nicely
station including a Seneca
x a Tenor & Soprano. Who Del. Gable
was, often during the evening
The laughing & general enjoy-
ment was catching to tables
Close by & some of the less
experienced smokers tried their
hands at firing - Several
gentlemen were attracted to
make a speech "at" us! One
fretted & another told us a
lot about "Disk" machines
and General messiment
one took the 12 o'clock train home
Approved

MUCKERS
OF THE
EDISON LABORATORIES

Chief. *Hughes*

After several failures a Business Meeting was held Feb. 27th at room XIII. Present personally or by proxy #13, 20, 22, 23, 24, 25, 26, 27, 28. March 13th was set for an outing day to be held at Otto Hopewell on Rose St. and the society was authorized to make the arrangements & to invite a number of guests, viz. to Mr. Weber, Rachel & Chemists & several others.

It was proposed to inform a larger attendance at these meetings.

Approved

MUCKERS

EDISON

GRANVILLE

Chief

Secretary & notes of events.

Feb. 11th a bathroom bought and suitable letter was sent to Ham. A. Sp. On the occasion of his 59th birthday Feb. 28 received letter from Mr. McKenney.

Outing in Orange March 13th 1906.

The largest Outing ever held, was our dinner at Otto H. P. Present: Chief Sec. Treas. Walt. Miller. Appleworth. Permann. Nachman. Ludwig Ott & Mrs. Bee. Lushan. Canning. Hansen. Lincant. 2 guests (2 Chemists) Dr. Frothe. Plaintes also Karpas (from Juss.) & Dr. Nachman. He sat down at 8³⁰ to a well prepared German style dinner: Oysters, soup (Pos), Roast, (Jambarten), Christ on toast, Vegetables, Dessert, various, diverse cheeses & pies.

& an Excellent Coffee - Claret Rhine wine & Colberg Beer - Cocktails etc etc!

Permann showed off a tenor voice in real concert style only his words were uttered, not melody, & the singing rebounded from the walls the hearing with true magnetic attraction was laugh muscles every whither. Dr. Frothe grotesquely gave us an eagle song & he happened to be there very largely - Imitation of the voice of a linen weaver, shrill

146 was very excellent indeed.
In his speechmaking, he filled
slot of this illustrious ancestor,
"Dr. Frederick de Goothe"; I see
most generally and beneficially
to an overdose of Phosphorus,
although his depth of teaching
his capacity as to no quantity
quantity - He undoubtedly had
the pleasure of liquid fullness
both in his avoir du jour than
as also of his salina. Last
he swallows with marvelous
regularity, showing modern
an excellent system! 12-20 years ago
#13. Gave a few piano numbers
to both willing & unwilling
listeners. He converted one
was animated & many a
gale vibrated in the air.
Our artist friend (#24 and
J. McAndrews) in graceful
curbed lines, produced few
choise parrotatures did
in it all, the assembly
showed a spirit of cordiality.

and a few Society of Ep't
board officers.
Mr. Ewing vacated evening in London
was addressed as follows.
At the beginning of our talk, he stated:
visiting you, to have in your holiday
the needed & well deserved recuperation.
From our festive board we all
now send the greeting and our hope for
you: "Waltham and Health ^{to the} ~~to the~~
^{to the} ~~to the~~
This message by Mr. Ewing
to postal card, we send to Albany
and London. ⁽³⁰⁰⁾ There on a job of two,
and so were split out from hearing
or impromptu.

Will. B. told of Baughman giving a
Berlin geranium (leaving the Storax Root,
shrub, tree & in Pleuroid). \$50.00 for
table 30" ^{high} and to a W.G. Primer. This
the Roberts remarked to B. I am here
six weeks & over & spend almost 600
marks - an expensive life in this
in W.S. - Not knowing where to go
to get the Baker B in two days,
I had nothing to do. I will
\$27.50. Up passed the Autism

hair in layers (ok was well
waxed & poulticed) And Billy
B had a $\frac{1}{2}$ - a for some time to
convince the Berl. B. he should
pay it out of the Benevolent B.
(Bogum) 500th fund - when up
cries the inimitable Warren
- Billy who was the Mark ??
- After the laughter Warren con-
tinued - he's a bird - a bird -
a lark! - his father & mother
went out for a lark before marriage
and = ~~he~~ - is - "!!"!! -

Some part of the ~~officers~~ were
discussing very seriously the
Auto question (while Brian
experimented how to swallow
a teaspoon of leaders' horse-
man when some one recited the pro
& often repeated story of indignity
deceit as made by Dr. H. D. D. D.
invited to Res Grants dining
room - the stories of the Man
with broken heart - Latest ~~with~~
Hippodrome - Frodo's ~~story~~ ^{story} - Radman's ~~story~~ ^{story} -

Both the Wash by Mother - the 149,
Patrick's birthday question:
($8 \times 9 = 17$) ultimately climaxed
in Dicky stories! Billy B.
gave a very ^{good} about some of
Bellevue's, accurately describing
towns, distances, & general scenery
- at the finish of all reliable #
8x. Billy asked Billy, how
much to the fare!

About 12³⁰ AM Karok 14th,
he broke up to pass to the Anti
room; gradually the Muckers
thoughtfully stopped towards
- yet few - [those of the Owl
think] stayed to console our
x #9. For the above 12³⁰ est.
bathed itself by above yard #9
having lost the 11th train. &
the next M. 9 opportunity (viz.
1st 17) the celebration #9 got by
a hairbreadth. On # 19x
kept his promise to either
go to Boston or come to R.
Cutting by going to Boston.
Bylawark. Brook & C. H. with here

1st The only absentee's Happy Day
 at the remainder of our \$
 25.00; the members are
 all right! Oh yes, oh yes!
 I felt all right last night.
 Hurt to day - (clad in his hand
 right left right left) I don't
 feel like a goat!!

The cost of our cutting
 is banner figure \$44.00
 Approved OF THE GUINAM
 MUCKERS

Chief Mucker, Edison

Secretary's notes of Council
 each 16th received appli-
 cation for Membership
 from Louis D. Mueller by
 C. A. Rogers President
 Taylor, Gluck & Co.
 by Rolland's Dec. respectively
 each so received
 Letter from #24.
 Officers for personal
 (financial) reason
 his temporary resignation.

Through the Crane Writings
 March 16th 1906.
 The Muckers of the Edison laboratory
 enjoyed a very enjoyable evening
 restaurant in Case street, Tuesday
 evening. Among those present were
 Chief John V. Miller, Secretary A. T.
 E. Wagonman, Treasurer Al. Worth
 and, fifteen members of the Muckers
 A full course dinner was served. The
 guests of the evening were I. M. Lan-
 den, of the Leander Automobile Com-
 pany, and W. Bachman, of Allentown,
 Pa. The members of the association
 furnished the entertainment. The
 members sent a letter of greeting to
 Thomas A. Edison, a former member of
 the association, who is now in Florida.

April 31st Letter from #15. Janssen
 April 15 Good Card from Haas
 18 " " " Dr. Ross.
 1st " Resignation from Perman.

Business Meeting held May 15th '06
 in room XIII. present #13, 20, 22
 23, 25, 26 proxies 27, 28 & 16 & 11.
 Secretaries report read & adopted.
 Letters & postals read. #24th resignation
 for reason given was accepted.
 Treasurer reports cash \$110.50 dues
 \$54.00 (incl. May) accepted.
 The constitution as read and
 approved by Council (yes #11)
 Was unanimously accepted.
 A slight change in reading of
 Associate Membership was
 voted. A Committee of #
 11 & 13 was created to draw
 up some By-laws for the Club.
 John Ott was unanimously
 elected to Honorary Membership
 as #35. In the Election for

152 new muckers have passed
 Greenley as #29 Rogers as #30
 Gaskler as #31. Ross as #32
 McLauchlan as #33. Fresh as #34
 He #33 was elected as Associate
 Mucker.

Café Boulevard in N.Y. was
 decided upon as our next
 Outing place for May 24th
 start Del Racha 6:34 P.M.

It is proposed to save
 up some money to hold
 sometimes in July or August
 a full days Outing.
 Approved.

MUCKERS
 EDISON LABORATORY
 ORANGE, N.J.
 Chief. M.

Outing at Café Boulevard
May 24th 1906.

Invitations were extended to
 Mr. Meyer, Kupper (Pres. cited)
 Gaisler, Kovark, Doug Chemists
 Hester, Burrows, Eggleston at table.
 It had been decided not to ask [unclear]

present were 13-19, 20, 22, 23, 25, 26, 27
 28, 30, 31, 32, 33, 34, 39. Kovark happened
 along (19 in all) During the dinner
 the usual cards were sent and
 to Mr. Edison (absent on an auto
 trip after Cohet, having an one
 auto a chemical laboratory outfit)
 we sent a bill of fare mentioning
 for the different courses chemicals
 used in the protest experiments.
 Arriving the cocktail was taken
 in the front part of the house & by
 7:40 Oat table was ready for action.
 The Chemistry Element was on the
 one half of the table - the heavier
 Elementarians & older ones on
 the other. All during the evening
 groups of 3, 4 or 5 would form
 with an occasional shift of
 seats bringing thus about a
 very harmonious social feeling
 which made every one enjoy the
 evening. The Hungarian band
 awoke the musical lovers to many
 a hearty handclasp. During the
 evening, May 25 sent a postal

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messing an its way - ~~coming~~
 every square to a treat
 Most of the bridge pieces & ~~one other~~
 matches - few then down to
 the great amusement of
 all. A sale of 12 tickets for
 a benefit drawing (500 tickets
 at \$1.00 each) for the Edison
 agent Pac. Galippi who
 took everything in the San Francisco
 earthquake took place ~~evening~~
 fully. The Club took the last
 two chances # 4 -
 The dinner was excellent
 & at 11:30 we broke in two
 parties 10 for Orange &
 8 stayed in New York -
 The eve. was considered
 a great one in every way
 Approve

MUCKERS

OF THE
 EDISON MUCKERS FOR
 NEW YORK, N.Y.

Chief M.

Secretary, & notes of interest.

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Monday June 4, 1906.

A meeting of the Muckers was held
 in room 14. in order to decide upon
 the best way to honor our beloved
 Secretary Mr. A. J. E. Waugaman
 who came to a very sudden and unexpected
 death at Bath Beach June 2, 1906.
 It was decided that all the brother
 Muckers attend the funeral in a body
 and that the following resolutions should
 be adopted and spread upon the minutes
 of our club.

Whereas by the untimely death of our
 late Secretary A. J. E. Waugaman the
 Muckers have lost an efficient and
 conscientious officer, and the members
 thereof a warm trust and loyal friend,
 whose good nature, sunny disposition
 and unselfish character must always
 be treasured with the pleasant recollections
 It is resolved that in respect to his
 memory, this statement of our feeling.

be spread on the record of this society.
All absent members were notified.

Present at the meeting.

Messrs. Shaw, and Albert K. Smith, Dyer,
Holland, Greenly, Bachmayer, and Hill.

Business Meeting, Friday June 29, 06.

Present. Chief, Treasurer, Nos 23, 25,
26. Report of No 26 acting as Secretary
since the death of our late Secretary was
approved, as also the minutes relating
to our feelings upon the death of No 13.
The appointment of a new Secretary was
in order. No 26 was appointed by accl-
amation. The arrangements for an
outing were independently decided upon
No 25 suggesting an outing upon
some sandcraft to parts unknown to
us as yet. No 26 suggested the use
of auto traches to Staten Island for a
shore dinner. The matter was left by to
the Chief Nos 23 and 25 to decide upon
the best route to pursue.

Leaving July 7 We all went to Bayonne
in automobiles present 1: a Chief Treasurer Secretary
Nos 7, 8, 9, 20, 22, 23, 25, 28, 30, 31, 35. The trip
was made in little over an hour over the beautiful
Newark meadows scented with *Lactaria*. Mr. Harris
and his wife were present, also his jovial humor
was with him. Some one suggested that
the hot plates received might be good foot
warmers, and that the carpet used under
them came from Mary's room.

The dinner was thoroughly enjoyed as much
so that our guide missed his way and
led us about ten miles west of the way
where we scattered in all directions. One
incident of the trip was quite comical.
One was run out of water whereupon we
stopped two gentlemen? when we asked where
we could get water and were informed that
it was after 12 o'clock and the whole State of
New Jersey was dry, you could not even get
water unless you smother the janitor of the
City Hall.

Business Meeting Wed. Oct. 10, 06

Present Treasurer, Secretaries and Members
Nos 20, 22, 23 & proxy 25, 34.

The question of having an outing was brought before the meeting. It was moved by Nos 25, 20 that we have the outing in charge. The motion was seconded by No 22 and carried.

Second motion by No 25 to the effect that we have our meeting at Otto Nitzmanns was seconded by No 34 and carried, next in order was the question of inviting guests. Two persons were suggested and unanimously declared to be unacceptable for various well judged reasons. Thereupon it was brought before the committee to invite Mr. Silmore who upon Mr. Silmore's absence, Webb, Ague, and Randolph were put down as invited guests.

The report of the Treasurer which was next in order was read.

Cash in Treasury

10.44

Balance in Pans till

67.00

Total

\$77.44

Paid to

.75[¢] for our sister's stamp.

Meeting then adjourned.

Business Meeting Oct 20 06

Presently Treasurer, Secretaries and Members 20
22, 23, 25, 29.

On account of the death of Mr. Nitzmanns who at our previous meeting we decided to have our outing it was decided to have our outing at Adelb. Stiller in Munich. It was decided to have all dues paid every month in order that the secret would not be so large and also that the treasurer may know the amount of cash on hand before an outing.

Business Meeting Nov 2 06.

Ground. In Germany. And also Mr. H. H. Holland. 2. Mr. Hoffen elected a member - Mr. Holland and Mr. Hoffen to see about Mr. G. and as a member during \$113.00. It was decided to have an outing at Adelb. Stiller in Munich for 16 as all thought Mr. Stiller would like to come if it were held across home. Many rejoined.

Cutting

Admitted Students in November.

Month 1906

Present Mr. Edison and all the Members except Nos 7 and 29. All the members enjoyed a fine evening. Mr. Walter Miller had asked the Members to invite Messrs Collins, Carlson, Bentley and Jandao. Mr. Cohen was also present.

Mr. Bentley's piano solo was received with enthusiasm as were also Mrs Jandao's violin solos who put feeling in the music.

Mr. Collins and Mr. Carlson gave duets in great style. Love it alone. The knowledge men sat. Mr. Edison came in later and made everybody feel merry. This meeting through the kindness of Mr. W. Miller and the wonderful guitar was made exceptionally pleasant.

These Members are all thankful to Mr. Edison for his kindness in paying the entire expenses of the night which was entirely unnecessary but on account of the (Members) was much thankfully received.

Business Meeting

Jan 7, 1907

Present Treasurer, Secretary and Members Nos 22, 23, 29. Some of the Members who knew of the meeting having been informed by the Secretary and Treasurer also did not appear so the question of fines for these gentlemen was brought up but laid on the table.

It was decided by all to have an evening Jan 17, 07. at either the Hoffman House, Kitchens or Hope Martin. The Secretary and Treasurer were appointed to decide which would be the best place. On the 9th the report of the committee was given orally to the chief and decided to have our meeting at the Hof Braun. The report of the Treasurer was read. Carlson had

Inv. dues to Feb. 1.

Total 145.00

Report of the Secretary was read in regard to previous meetings found accepted; I invited guests Messrs Collins, Weber, Meyer, Collins, Carlson, Bentley, Jandao and Bell.

Meeting Jan. 17, 1907

at the H. of Grace House New York City
 Present: Chief J. V. Miller, James A. Smith,
 Secy. F. W. and Muehler Nos. 7, 16, 18,
 22, 23, 25, 27, 28, 30, 31, 32, 36;
 Present as Encls. Minors Dwyler, Collins,
 Jaudon, Murphy, Simon Porter.

Mr. Meyer had his first experience with
 the Muehlers at his Dinner.

Mr. Collins gave us some of his well
 known, even longer, but he also showed
 us that his voice at one time some
 well adapted to classical music as
 all of us were aware of when he sang
 "So I stood on the Bridge at Midnight".
 Mr. Porter gave us his famous short case
 scene as also his retirement experiences
 which briefly happened at the close
 of our meal otherwise we might all
 be here to inspect our courses.
 The Muehlers were all interested in
 the Free decorations which were
 all of German origin.

Mr. Whiting was well informed by one of
 the Muehlers would not be there. But
 we all see that he has proved himself
 a faithful standy to our friendship.

Business Meeting Feb. 26, 07
 Present: Chief, Treasurer, Sec'y, and Members
 Nos. 18, 22, 25, 28, 36 By proxy 23.
 The Report of the Secretary in regard to the previous
 business meeting and outing was read and
 accepted.

Report of the Treasurer Cash on hand \$21.04
 Total Am't. due to Feb. 31 = 51.04
 read and accepted.

Amount expended at Last Outing

Bar	13.10
Dinner 7 B av	76.25
Special Wines	6.25
Waters	3.00
Head Waiter	2.00
	100.60

Next in order was the election of officers
 The same officers being unanimously re-elected
 Chief J. V. Miller Treas. A. W. Keith
 Sec'y. L. E. ...
 Member # 18 suggested in this election that
 on account of no discrepancy in funds
 our Treasurer should by all means be re-elected.
 (Unanimously)

Mr. Meyer was proposed as a member by
 Mr. Bachman it was voted upon and
 accepted.

Messrs. Wilcox, Cohen and Saul were brought
 up as members, but the motion was given
 over to a committee of two (Mr. Gylesworth
 and Mr. Holland) to consider and report
 at the next meeting.

Next in order was the consideration of an
 Outing Mr. Bee and Mr. Whiting
 were appointed to arrange the time
 about the middle of April and the place
 would be seen to.

It was also voted to bring up the
 question of definite Outings at our next
 Outing so that all present may be able
 to vote upon it.

Meeting adjourned
 P. S. The Constitution was to be considered
 at our next business meeting.

Meeting Sunday, Sept. 26th 07,

A summer party was held to go by boat to
Bayonne. Mr. Helget was kind enough
to give us the use of his yacht to take the
Musicians down there. Mr. ~~Thorndyke~~
Korneloff was an honorary guest.

Present: Messrs. Harbor and Bengler Collins
as honorary guests. A shore dinner
was had at Mr. Donalds Shore house
not to be recommended.

Present: Messrs. Hougher, Holland, A. H. Smith,
C. H. Smith, J. S. Miller.

The number of people were few.

His dinner did not prove such a success.

Business Meeting July 1 07

A meeting was held to go by boat to
Bayonne and have a short dinner.
Mr. Helget was to be asked if he could
let us have his boat. This was to
be a summer outing. Present: J. V. Miller,
A. H. Smith, W. G. Holbrook, Henry, and E. Hooper.
H. Alt.

Meeting adjourned.

Mr. East was elected a member. Messrs. Miller and Henry were elected. Taken up.

Business Meeting April Mar 30 08

Present: J. V. Miller, Holland, A. H. Smith,
E. C. Hooper, Henry, O. O. Rogers.
It was moved and seconded that
Mr. Arlengard be taken in as a member
and a committee of three appointed to
inquire into the matter. It was
moved and seconded that an outing
be held April 8 1908 to the
Lafayette Boulevard where light music was
to be served afterwards to go to the
Circus.

Meeting adjourned.

Cutting April 8 1898
 To the Circus and Cafe Boulevard for
 for Dinner W. A. Bee, Lander
 Ross, Sadler, Bowler, Ben Smith
 Al. Smith J. Miller Mr Wright
 guest. O. O. Rogers. Holland. Paul
 Cutting was not present at this
 outing.
 Dinner first at the Cafe Boulevard
 then the members repaired to the
 Circus.

Business Meeting
We should have had

Cutting —
We should have had

Business Meeting Dec. 8 '07

This meeting was held to determine upon dues, Permanent Outings, Initiation fees, etc.

It was noted that there shall be a definite number of outings in a year at a definite time in the month in which they are to take place.

It was also noted that the dues shall be one or two dollars a year or thereabout. The question of guests paying for dinner was brought up. This together with the preceding subjects was left to the officers of the Association to frame up. This has been done and will be brought forward at the next meeting Jan 26th '08.

Business Meeting Mon. Feb. 3, '08

Present the following: Nicholas M. Dyer & his 1 Albert Worth, H. J. Fox, Rogers, Miller, V. and G. W. Holland.

Election of officers. was the first thing taken up. The following were elected J. V. Miller Chief A. Worth Treasurer L. W. Secretary.

A Committee of three was appointed (the third member of committee being in dispute.) Messrs. Holland and Beebe to arrange for the four regular and any special outings in conjunction with the three officers for the year 1908.

The by laws were accepted and will be arranged by the three officers of the Association.

Meeting Feb 26-07

Business Meeting Thursday Sept 3, 08.

Present Chief Steady & Sumner, Masters Sadler, Rogers, Holland (G. proxy), Hooper & Greenly. The chief proposed an outing to Long Island this was decided upon and the following arrangements were made.

Meeting to be held Saturday Sept. 12, 08. to Long Island by way of the 22nd St. boat at 3:45 P.M. Dinner to be at Feltman's, and as an Honorary Guest it was decided to have Mr. Helgel in return for offering his boat to our use and also past service. Meeting adjourned.

P.S. Moved and seconded that Mr. Ruffin Arbogast be elected a member motion carried.

Business Meeting October 26th

Present W. H. Alvord, J. V. Miller, Albert Ward
and George Wooper. L. Cott.

It was moved and seconded that
the Muskeg have an outing Nov. 6, 7th,
at Archibald & Tellers. It was moved
and seconded to leave. Messrs. Harlan
and Bengler set to give us their ticket
if we could arrange for them.

Meeting adjourned.

Outing Nov. 6, 08.

Present Sadler, Ross, Lander
W. H. Miller, Bee, C. Wurth, W. Holland
J. V. Miller, A. Wurth, Bengler, Ed.
Muskeg, Berne Harlan, Monahan,
Orests, Wright, Milliken, H. Miller
A. M. Hurd. Held at Archibald
& Tellers. Secretary was not present.

so I received reports from A. Wurth.

O. D. Rogers and W. M. Beebe promised
Bill amounted to 2.52 for food
Total Cost \$4.58.5

Messrs. Harlan, Muskeg and Bengler
entertained with popular songs
and jokes.

Business Meeting Feb. 7th. 09.

This Meeting was a novel one. It consisted of the faithful three Chief Treasurer and Secretary. It was decided that it was about time to have a big meeting for the election of officers. It was also decided to have some refreshments and to have this meeting held at Adelle Stettin or some where else in Newark. The motions were all carried and therefore Feb. 24, 09. should be noted as the Big Meeting?

The next adjourned all three moving from the rear cage position in the hallway of the Laboratory. Prepared to elect Messrs. W. W. Wagon and Mr. Dodge.

Cash on hand	32.05
Expense Account.	22.60

67.20

Mr. Dodge & Mr. Wagon ~~from~~
~~Wagon~~ ~~Hamber~~. Elected as Messrs. unopposed.
 Mr. Dodge. Mrs. Dod. Mr. Wagon to be continued
 Mr. B. & Mr. Bowden. as committee
 who went out in the other room
 to buy these gentlemen are to notify them
 upon their election.
 Chief. Mrs. Bee and Mr. C. S. Wagon
 were nominated Mr. Bee 10 C. S. Wagon
 1 Mr. Miller 1 Election made
 unanimous by vote of Mr. Bee as chief
 Mrs. A. Wagon. unanimously
 elected Treasury

Secretary. Moved and seconded that
 Mr. Walter H. stand be made Secretary,
 three members of Entertainment Committee
 Mr. John Miller elected as chairman
 of the committee's business.
 Mr. Jack Ross elected as chairman;
 Mr. Walter and John Miller as members
 of the entertainment committee.
 Mr. P. J. Letter ^{was read} ~~received~~ ^{he was}
 not present. ^{you}
 Love of Charles to our retiring officers.
 Moved and seconded that a
 2. a. Brought up the subject
 of having lectures at some of the
 meetings.
 Moved and seconded that the entertainment
 committee shall be instructed to
 have lectures of a scientific or
 other subject. Motion carried
 Moved & seconded that we adjourn.

204

29. *Les D. Greenley*
New Valley Road.
West Orange

30. *O. A. Rogers*
Shen Ridge N.J.

205

31. *F. H. Sadler* 18 Gates Ave. Williams
Brooklyn.

32. *Ed. J. Rosoff*
Little Silver, N.J.
Rising

206 Associate Member
33. J. M. Lunsden Jr.

2 University Place S. O. La. 3466 U. S.
Lunsden Co 5405 ~~5405~~ S. O. La.

54 M. & C. R. R. (the branch)

34. Fred P. Ott

Valley Road W. Orange
Presyd

Honorary Member 207
35 John F. Ott

175 High St. Orange.

Orange, N. J.

36. E. H. Hooper Jr.

208

37 H.I. Meyer.
375 Fulton St.
Brooklyn N.Y.

38 Adolph Paul,

39 Mr. Ralph Arlengast.

209

List of Entries
in Laboratory

March 1899
 April 1899
 April 1899
 May 1899
 Feb. 1902
 Sept. 1901
 June 1902
 April 1902
 April 1902
 Dec. 1902
 April 1903
 Feb. 1903
 Feb. 1888
 Oct. 1904
 May 1901
 Nov. 1888
 June 1902
 Sept. 1898
 Apr. 1904
 July 1894
 Nov. 1901
 Nov. 1870

+ #5 died Jan. 23rd 06 at Island Ky.
 + Died June 2, 06 at B. all Brook N.Y.

List of the Muckers.

	<u>Date</u>	<u>Name</u>	<u>Place</u>
1.	May	J. B. Bullington.	1903
2.		C. W. Chapman.	1904
3.		J. F. Miller.	
4.		R. R. R.	Dec. 1904
5.		J. K. K.	June 1903
6.		J. O. R.	Oct. 1903
7.		H. K. K.	January 1903
8.		H. A. H.	Sept. 1905
9.		P. F. C.	January 1903
10.		M. T. T.	May 1905
11.		F. L. D.	
12.		M. A. R.	March 1904
13.		A. E. S.	
14.		E. W. S.	Feb. 1906
15.		N. H. S.	May 1905
16.		H. T. S.	
17.		H. T. S.	did not qualify
18.		H. T. S.	
19.		H. T. S.	
20.		H. T. S.	
21.		H. T. S.	
22.		H. T. S.	

Address changes.

#1.

J. B. Ballentine.

Shore One Missing Spk.

Fitzroy House, Arrived at London N.C.

Sunderland Works Jul Venedict & Co. London Wm

#2.

Cloyd M. Chapman.

~~For 1st time. H. H. Chapman & Co.~~

For 1st time. H. H. Chapman & Co.

627 W 136 St. N. Y. City.

627 W 136 St. N. Y. City.

222

#3.

John V. Mullen

#4.

Robert Repp.

of ~~Hoffman~~ ~~to~~ ~~12~~ ~~Dorothea~~ ~~St.~~
Berlin C.

✓ 14 Christiania Str. Berlin, N.

Dantische Str. in Cassinul. Ca

Dantische Str. 38,

12 Babaroffplatz in Cassinul.

#5.

223

Georg Hetherington 90 Hawthornwood Ave.
~~1425 Hawthornwood Ave.~~ ~~Reading, Pa.~~
~~Hetherington, 90 Hawthornwood Ave.~~

† died
 Jan 23rd 1906
 see page 142.

#6

Dr. John O. Ross.

Materialprüfungsanstalten.
 Teknische Högskolan Stockholm, Sweden.

224

#7. ³Henry Harris.
✓ 311 W. 85th St. N.Y. City

8

#8
W. A. Warren
N. School of Engineers 446 N. 56.
2 running place E. Range.
Kington P.O. box 1001,
Simplex Co 1000 L. St. Bk. Newark
60 Nassau St.

225

#9. Percy F. Cowing. ^{14 Wall St.}
~~Residence 100 West Street New York City~~
~~100 West Street New York City~~
~~100 West Street New York City~~
P.F. Cowing ~~100 West Street New York City~~
~~100 West Street New York City~~
P.F. Cowing & Co My Under Five Years 1888
Amsterdam Ave New York.

#/O. Ingeniör

#10 Ingeniør.
Nils Traaheide
~~at Skotte.~~
~~Indbygger i~~ Indbygger i - p. 10
No. 6
~~Indbygger i~~ Indbygger i

226

#11.

Frank W. Dyer

Head of Parkhurst place

#12.

W. A. Rosamett

125 District Ave New Rochelle

9th St New Rochelle N.Y.

311 Huguenot St. New Rochelle N.Y.

227

+

#13.

A. Theo. E. Wengemann

Kelly road. 17 Parkcock place.

Died
 June 2. 06,
 Oak Beach
 See Page 155

#14

Edward Linan.

230 E. 3rd St.
 Le Rochelle N.Y.

228

15. Mathew Hys Hanger ^{of Int'l. Har.}
Comp. B. H. C. U. S. A. Practice, S. Francisco Cal.

#17.

Die Hof Qualifikation 229
~~Wacht. Ordnung ist. Einig. Neue. Neue.~~
~~Schiff. Letzte. Auf.~~

#16. Walter K Miller 28 1/2 Vernon Ave.
Orange, N.Y.
65 4th Ave N.Y. City

#18. J. W. Aylsworth. 223 Highland Ave
East Orange.

230

19 Allen H. Whiting ^{2. Storage Bldg. 12}
 2 University St. E. Orange
 T. F. 8400 W. E.

~~Atlantic C. Edison Co.~~

Atlantic Motor Car Co. 57th & Broadway N.Y.

20. Alb. Wirth ^{1st Jany}
 15 Hudson St. Orange
 177 High St.

231

21. Algon. J. Spabert

injured -

22. C. Wirth ^{1st Jany}
 15 Hudson St. Orange
 177 High St.

232

23 M. E. Holland. 211 Arlington Ave.
East Orange.

24 Mr. H. P. Hermann. 317 Orange St.
Newark.
resigned

233

25 Rob. A. Bachman
100 Watchung Ave. West Orange.
resigned

26 Louis F. Ott 175 1/2 York St. Orange
Ludwig

27. N. G. Dec -

Hamfield Ave
Glenside, Pa.28. W. M. Brodie.
Stou Lake N.Y.

Valley road.

Copy of letter
sent to Mr. Edison
on May 19th 1905
see page 167.

Pabst, Harlem, N. Y.

May 19th, 1905.

Our Dear Mr. Edison:

Muckers assembled in a farewell dinner to Traaholt & Hansen, after toasting the Country remembered foremost the man we love and revere. Many a times praises and eulogies were spoken, but none as hearty and simple as the sentences given from the heart by the ones closely connected with your work, as were heard here to-night. If ever blessing and comfort came from the heart of the Young in admiration of their Master, it is from ours, and we wish your lot to be a successful one and in health to enjoy for many years to come your life work. We are always and ever your

Muckers,

Traaholt. Hansen. Warren.

Cowing. Whiting. Mangemann, sec'y.

(Absent:)

(J. V. Miller, chief. Aylsworth.

W. H. Miller. Dinan. Dyer.

Worth. Arbogast.)

Continued page 204

Copy Feb 11 1906

235

Dear Mr. Edison

On the anniversary day of your birth the members of your Laboratory offer to you their best wishes for the coming year.

We are glad that last years illness has passed and we all hope for your success, your good health and for a continued contentment and happiness in your life work.

Sincerely Yours

2

POSTAL TELEGRAPH COMMERCIAL



CLARENCE M. MACRAY, President

TELEGRAM

The Postal Telegraph-Cable Company (Incorporated) transmits and delivers the messages subject to the terms and conditions printed on its

22:5 W 12 702p

Washn Dc Mar 28

A P. A. Wangemann,

Confarence Hitt

8 & McDougal st.

Very sorry cant be with
you tonight send best regards
to all.

Frank L. Dyer.

Received at

WHERE ANY TELEGRAPH

*See book 9
page 9
page 10
minutes*

Orange Advertiser
September 22, 1905.



Special Muckers

EDISON LABORATORY
ORANGE, N. J.
FRIDAY, MAY 19, 1905

SERVED FROM 6 P. M. UNTIL 12 P. M.

ALBERT B. MEYER

238



Caricature of William
from Business Vice
1889.

publ
W. A. P.



unpublished manuscript
sent to me by Mr. [unclear]

1881

St. Francis

published and meet in papers of
the lawsuit on Electric Light & Heat
^{in connection}

**Muckers of the Edison Laboratory
Correspondence**

This folder consists primarily of postcards and other correspondence from members and former members of the Muckers of the Edison Laboratory. Included are letters by James B. Ballantine and Nils Traaholt, written at the ore milling plant in the Dunderland region of Norway, where both men were working in 1905. Other items include bills for dinners, humorous sketches by A. Theo E. Wangemann, and various versions of the organization's constitution.

Eight letters from members or former members have been selected. A copy of the Muckers' constitution can be found in the "1906. Edison, T.A. - Employment" folder in the Document File Series.

Henry S. Harris
March 19th 1905

311 Madison St.
New York City.
March 19/05

The Secretary of the Trustees,

Dear Sir;

I hereby desire to
express my thanks to you all for
the notices received notifying me of
meetings, also for the postal from the
Lunch at Life Boulevard. Am
glad to see that I have not forgotten

truly.

Since leaving Edison in July 1903
I have held two other jobs, both more
or less as a mucker, in Brooklyn
and N.J. and in September 1903
I went to the University of Pennsylvania
to study chemical engineering.
That is my present location, but
all notices addressed to my N.Y.
address will reach me all
right.

I regret sincerely that I shall
not be able to be with you
on the 24th, but hope to
be able to join you some
time and say "Skol" to the
crowd over a good glass of
Kulmbacher.

My best wishes to all old
and new Muckers.

Very sincerely
Harry S. Harris.

109 West Park Ave.

Ashland, Ky., April 11th, 1905.
Sec. Munkin J.
Edison Laboratory
Orange, N.Y.

Fellow members:

I have received your notice
of meetings recently & I was extremely
sorry I could not attend same.
I am located in a small town
on the Ohio River - Chemist to a
blast furnace & slag cement plant.
Often wish I went back to Orange
again. With regards and best wishes
to you all

Fremain

Very truly yours

G. H. Huntington

P.S. - Express remembrances to Chapman.

THOMAS A. EDISON, President.

W. S. MALLORY, Vice-President.

J. F. RANDOLPH, Secretary-Treasurer.

EDISON CHEMICAL WORKS.

TELEPHONE "80 BLOOMFIELD."

SILVER LAKE, N. J., 5-18-05

Mr. V. Traubelt Texas -
The Muckers of Edison Lab.

My Dear Bas Mucker:

Geo Hansen today
handed me a bill for \$4.50 for initiation
fee - \$4 each for dues during the month
of April & May.

When I joined the Muckers I distinctly
understood from Mr. Miller that there
was no expense connected with it
whatever, unless I went to N. J. to
the Outings.

Had I known there was I should
not have joined them as my finan-
cial condition would not warrant
me doing so.

Therefore I refuse to pay the initiation
fee or dues for April & May. &
hand in this my resignation to
the Muckers of Edison Lab.

Trusting you are well, and may
better yourself by the change you
are about to make -

Yours Very truly -
R. Arbogast -

R. Arbogast
May 18th 1905

Kjoro-Hansen
June 25th 1905

San Francisco, Calif.
June 25th 1905.

Dear Mr. Waugemann:

This is just to inform
you of my address which is:
Company B. A. C. U.S.A.
Presidio, S.F. Cal.

You did not expect
to find me in the Army,
did you? Well, I had hard luck
and could not get work anywhere,
Washington, Oreg. nor Calif.
How is everything?

Please remember me to my

friends. I forgot my slide-
rule in room #11 in the Scales'
drawer. Would you oblige me by
looking it up and sending it to
this address.

Am very busy all day
learning the "interesting" trade
of being one of Uncle Sam's
boys. Thanking you for past
friendship and favors, believe
me,

Yours sincerely,
W. Ross Hansen.



Storöcker, Sunderland.

Aug. 17th 1905

Dear friends!

I will not excuse myself; - the thing is plain enough! - I've been dead to the world; - dead as a doornail to all my friends, - even to the ministers, the jolly good boys!

- I've been studying the depth of a pair of blue eyes, and there I found a world of my own. - It is a strange work to do for a minister, - and the methods trust upset all basis of reason - - and let me tell you, - you can never exhaust the field, it is like running a series of experiments, you know. - But the results - get with! - I've never felt that sensation by running a successful experiment, and if my esteemed successor means what he says on that postcard, - let him not know, what he is backing about! I assure you, it is much more fun, than

to collect quarters from the muskies, - and -
- ^{can more than} ~~hush~~ - to have a scrap with the old man,
our beloved muskie-anting, and in it, -
when it is talk about a happy face of mind
- doesn't matter if the footpath is crooked or
not.

I am now in this joint working
hard under the heavy load of ¹⁸ ~~responsibility~~ ¹⁸ ~~responsibility~~
as chief electrician, - which some ¹⁸ ~~low~~ ¹⁸ ~~low~~
contemptible individuals here love to ¹⁸ ~~copy~~ ¹⁸ ~~copy~~
Lads in I will give you some interesting data,
this time only two, - to get an idea of the place.
1) I could raise 2 regiments of nice fat
Orange-cops in multiple with the ¹⁸ ~~Shewards~~ ¹⁸ ~~Shewards~~
with percentage of 9 ground-circuit
2) We have 150 tons of overhead bare cable only in
this part of the works, and I hate like hell
to see all that money stoving up in the air!
I'm a much we will try to turn our power station
and if I am not killed during that attempt
you will soon hear from me again!

With best regards to all the
muskies I remain yours
Mr. Storkheim Mr. Raman
Mr. Trachsel * 10.

Newark N.J.

Sept 20/05

To The Muckers
of the Edison Laboratory
Orange N.J.

Gentlemen

I received this day your esteemed
notification of my election to membership
in your club, and I hereby thank you one
and all for your kindness in voting me
a member. Should any member at any
time have any doubt as to my mucking
qualifications they can satisfy themselves by
just one look into my joint in
building #20 South-West corner top floor.
The benches have not been cleaned in six
months and the floor in two months.

Entered the
employ of the
Edison Co.
Feb 1889

Yours Truly
Alexander D. Pierman
327 Orange St.

Standard Construction Corporation Limited

Dundeland Works

CABLES
STANDARD, P.O. NIELSLELAND

Suldomeduk i Ranan Nov. 27th 1903
(Nanny)

Dear Old Muckus Friends,

I know I owe you many apologies for not answering the P. C. you have sent me from time to time. As I think I can lay claim to have been the hardest worked, as well as the dirtiest Muckus when among you. I think I will have to let that stand as my excuse because I do not think I have changed much in my habits. And writing has ever been one of the greatest loves of my life. The Muckus Greetings I had the pleasure to later pasted, will ever be a very pleasant memory to me. And as I have Muckus Tracholt with me here, we have many talks over old times. What a change I notice in the list of signatures, only four that I know and only two of them "Muckus" when I left you. I wonder how long it is going to take to clear out the last of the first ten "Muckus". I expect I shall be here till about June, when I hope to see this place in good running shape. Tracholt I expect will fill the position for which I engaged him, with credit to himself and the Company. He has got a big handfull but I think he will rise to the occasion. With kindest regards to all my old friends I remain Yours very truly, A.B. Bullantien #1 Muckus

March 29th 56

To the "Muckers" club of the Edison Laboratory

Gentlemen

I hereby tender my resignation from your pleasure club.

My reason for resigning (which is personal) I trust will not be considered as a reflection on the "Muckers" as a body, or, as individuals, and I earnestly desire to retain the good will of the "Muckers" in the future as I believe I have had during my membership in your club.

Wishing you much pleasure in the future and trusting I may have the opportunity of joining you at times as an Ex-Mucker I beg to remain

Very Sincerely Yours

Alf Pearson

N.B.

I gave personally as reason that he joined the Masonic Order and had an extra life insurance, which (two) demanded all his spare cash at present and he would join us at dinners any time he could & would repine the Muckers at a date he hoped not far distant & when easier.

**SUPPLEMENT TO PARTS I, II, AND III OF
THOMAS A. EDISON PAPERS: A SELECTIVE MICROFILM EDITION**

These documents cover the years 1878-1914, with most of the items dating from the 1880s and 1890s. Included are correspondence, notebooks and loose notes by Edison, technical drawings by unidentified draftsmen, agreements, scrapbooks, unbound clippings, and other items. Some of the documents were misfiled in later years of the Document File and subsequently identified during the editing of Part IV. Other items were uncovered during ongoing archival processing at the Edison National Historic Site. One letter from Edison to Henry Bentley, dated March 1881, was stolen from the site in the 1970s and later recovered. The documents are arranged in series, subseries, and folders that parallel the organizational structure of the earlier parts of the microfilm edition.

The only document from the 1870s is the agreement, dated December 31, 1878, among Thomas A. Edison, Egisto P. Fabbri, Grosvenor P. Lowrey, and the firm of Drexel, Morgan & Co. This agreement gave Drexel, Morgan & Co. authority to obtain patents in Great Britain and Ireland for inventions by Edison pertaining to electric lighting and power. Four documents from March 1, 1881, are related to this agreement. Two assign power of attorney to Drexel, Morgan & Co. to secure patents in Great Britain and Ireland for Edison's inventions; the others appoint Fabbri and Lowrey as trustees of his inventions in those countries.

Several other agreements also date from the 1880s. The agreement of March 23, 1881, between the Edison Electric Light Co. and the Edison Electric Illuminating Co. of New York provides the local company with exclusive use of two electrical power stations in New York City. An agreement of April 30, 1881, between the Edison Electric Light Co. and Miller F. Moore appointed Moore as head of the Edison Co. for Isolated Lighting at a \$6,000 salary and 5 percent of the profits. Also included are items from February and April 1882 relating to the assignment of Edison's British patents to the Edison Electric Light Co., Ltd. All of the agreements from the 1870s and 1880s have been included here as part of the Document File Series.

In addition, there is an exhibit from an 1888 agreement between Edison and financier Henry Villard. That agreement, which was filmed in the Legal Series of Part III, gave Villard an interest in twenty-three of Edison's proposed

Inventions. The inventions are listed and described in the exhibit. The exhibit can be found in the Miscellaneous Legal File.

Among the technical material from the 1880s is an undated pocket notebook by Edison containing notes regarding chemical compounds and their reaction to heat. An 1881 unbound drawing of a reciprocating dynamo is also by Edison. In addition, there are eleven oversize drawings by unidentified authors, which appear with other oversize material on reel 179. Eight of the drawings are from September and October 1880 and concern generators for electric lighting. A drawing made sometime during the period 1882-1884 involves a field generator for central stations. The two other drawings were probably made in 1887 or 1888. One pertains to a pyromagnetic device. The other relates to a pyromagnetic generator and contains manufacturing instructions by Edison.

The correspondence from the 1880s in the Document File Series deals primarily with experimental and business matters at the West Orange laboratory. There is also a letter to Edison from Dr. Richard D. Owen, a son of Robert Owen, the British utopian, social reformer, and founder of the New Harmony commune in Indiana. An 1885 book order by Edison, drawn from the *Publishers' Trade List Annual*, includes works on composition and grammar, philosophy, psychology, mythology, and economics. An additional item from the 1880s can be found in the Scrapbook Series. The book contains typewritten transcriptions of local newspaper reports, illustrations, and other material relating to the exhibition of Edison's inventions at Mechanics Hall in Worcester, Massachusetts, in May 1884.

Two notebooks and one pocket notebook are from the 1890s and early 1900s. Two mostly undated notebooks, used by Edison from the late 1890s through 1902, provide information about experiments on electric lights, filaments, x-ray machines, and storage batteries. They also include notes and drawings of railroad cars, conveyor systems, and rock crushers relating to either the ore milling plant at Odgen, New Jersey, or the cement plant at Stewartsville. The pocket notebook, part of the Company Record Series, was used by Edison during the period 1898-1900. It contains notes regarding the performance of equipment at the Odgen plant. In addition, there is an unbound drawing by Edison of a meter, dated April 1898.

Much of the correspondence from the 1890s, included in the Document File Series, concerns personal and family matters. An 1891 letter to Edison from Friedrich A. Krupp of Krupp Munition Works, describes an arrangement of writing table implements that Krupp had sent as a gift to Edison. Two letters from 1898 pertain to Thomas A. Edison, Jr., and his business activities. Other correspondence from 1898 relates to Mina Miller Edison's brother, Theodore Miller, and his death while serving with the Rough Riders in Cuba during the Spanish-American War. In addition, there is an 1898 earnings report for the Edison Electric Illuminating Co.

Among the other items from the 1890s are unbound clippings from the *Century Magazine* and the *Weekly Tribune* of Port Huron, Michigan. "Edison's Invention of the Kinetograph" by William K. L. Dickson and Antonia Dickson, published in the June 1894 issue of *Century Magazine*, traces Edison's early efforts to simultaneously record and reproduce both motion and sound. The *Weekly Tribune* article, written by George P. Lathrop in February 1895, is an account of the life of Edison's father, Samuel Edison, Jr.

Three scrapbooks kept by Edison associate Charles Batchelor can be found in the Special Collections Series. They cover the periods 1890-1894, 1890-1896, and 1901-1914. Included are newspaper profiles and interviews with Edison, along with clippings about electric lighting, ore separation, x-ray experiments, aerial navigation, high-speed locomotives, new uses for the automobile, and a variety of other subjects.

NOTEBOOK SERIES

Notebooks by Edison

N-02-02-10 (ca. 1895-1902)

N-02-10-10 (ca. 1895-1902)

Pocket Notebooks

PN-Undated.18 (ca. 1885)

Unbound Notes and Drawings (1881, 1898)

Oversize Notes and Drawings (1880, ca. 1882-1884, ca. 1887-1898)

[filmed with other oversize material on reel 179]

DOCUMENT FILE SERIES

D-78-21	Electric Light - Foreign
D-80-04	Edison, T.A. - General
D-81-04	Edison, T.A. - General
D-81-22	Electric Light - Edison Electric Illuminating Company of New York
D-81-26	Electric Light - Edison Electric Light Company
D-81-33	Electric Light - Foreign - United Kingdom
D-82-39	Electric Light - Foreign - United Kingdom - General
D-84-13	Edison, T.A. - Employment
D-85-10	Edison, T.A. - Book and Journal Orders
D-86-39	Telegraph
D-91-02	Edison, T.A. - General
D-91-33	Glenmont
D-92-26	Electric Light - Foreign
D-93-02	Edison, T.A. - General
D-98-06	Edison, T.A. - Family - General
D-98-07	Edison, T.A. - Family - Edison, T.A., Jr.
D-98-15	Electric Light - Edison Electric Illuminating Company of New York

LEGAL SERIES

Miscellaneous Legal File (1888)

SCRAPBOOK SERIES

Scrapbook, Cat. 116,993 (1884, 1896, 1909)

UNBOUND CLIPPINGS SERIES

Clippings (1894-1895)

**COMPANY RECORD SERIES
NEW JERSEY AND PENNSYLVANIA CONCENTRATING WORKS**

Plant Operations Records (1891-1903)

**SPECIAL COLLECTIONS SERIES
CHARLES BATCHELOR COLLECTION**

Scrapbooks

Scrapbook, Cat. 1346 (1890-1894)

Scrapbook, Cat. 1246 (1890-1896)

Scrapbook, Cat. 1328 (1901-1914)

SUPPLEMENT

NOTEBOOK SERIES

Notebook, N-02-02-10

This notebook was probably begun in the late 1890s, although the only dated entry is from 1902. All of the entries are by Edison. At the beginning of the book is a list of chemical compounds and their properties. Some of the compounds are indicated for possible use in squirted filaments or fluorescence experiments. The list also contains many references to Henry Watts's multivolume *Dictionary of Chemistry*. Another set of entries, bearing the title "Phenomenon of the Lamp," pertains to tests of incandescent lamps. Included are measurements of carbon buildup, along with notations regarding the amount of current running through the lamp wires, the duration of burning, and vacuum levels within the bulbs. Some of the experiments are on lamps with platinum or bamboo filaments. There are also entries labeled "Theory No. 1," in which Edison considers why certain lamps, including those with bamboo filaments, are breaking. In addition, there are several drawings of railroad cars, conveyor systems, and rock crushers relating either to the ore milling plant at Ogden, New Jersey, or to the cement plant at Stewartsville. The one dated entry is from November 1902 and involves chemical solutions for storage batteries. The pages are unnumbered, and several pages have been removed from the book. Approximately 100 pages have been used.

G₁₂ #10 O₂
144 10 32 - 186 N-02-02-10

C₂₄ - H₂₀ N₄

288 20 56

C₃₀ H₂₅ N₅
360 25 70

$$\begin{array}{r} 24 \\ 12 \\ \hline 24 \\ 24 \\ \hline 2.88 \end{array}$$

$$\begin{array}{r} 288 \\ 20 \\ 56 \\ \hline 364 \end{array}$$

$$\begin{array}{r} 364 \\ 2184 \\ \hline 2184 \end{array}$$

$$\begin{array}{r} 364 \\ 56000 \\ 18200 \\ \hline 14000 \end{array}$$

$$\begin{array}{r} 791 \\ 154 \\ \hline 101.3 \end{array}$$

$$\begin{array}{r} 360 \\ 25 \\ 70 \\ \hline 455 \end{array}$$

$$\begin{array}{r} 186 \\ 144000 \\ 1384 \\ \hline 1384 \\ 36000 \\ 3185 \\ \hline 3185 \\ 455 \\ \hline 455 \\ 14 \\ \hline 14 \end{array}$$

$$\begin{array}{r} 364 \\ 2880000 \\ 2184 \\ \hline 2184 \\ 3276 \\ \hline 3276 \\ 68440 \\ \hline 68440 \end{array}$$

791

$$\begin{array}{r} 791 \\ 154 \\ \hline 95.18 \end{array}$$

part 2nd 3 sup

N-02-02-10

Gautier Oil sec about
brown amorphous in item -
brown amorphous in item -
adding nitrogen a

Gelsolin amorph
Hydrochloride "

Gluconic acid - Barmsalt
gummy

Glyceric Thioaldol
waxy mp 80 C

glycerum 2 pts heated for 20 min
at 120 when phenol 2 pts
4 sub acid 3 pts amorph dark
Red color thick mass 082

dis in ag then HCl thrown down
in coloring matter.

~~Chlorobromhydant~~

Mercuriothioglycollic acid
see glycollic acid

Pb salt amorph Hg salt do

Cuprosolthioglycollic acid
amorph compounds

Phenyl-Thioglycollic acid

Pb salt amorph hardens
mp 60. Cu salt amorph
Chromic do.

glycosamine
black amorphous mass

glycyrrhizin amorph.

glyoxaline

glyoxaline Sulphate + K nitrile
or hydrochloride + AgO heated
long time. salts of result
amorph.

Tribromoglyoxalonic acid
with triple hydrocyanic etc.
the only known organic ~~body~~
~~acid~~ acid not containing
Oxygen

glyoxyl-Carbamide
soln salt amorph

glyoxylic acid gummy

Most graphite are
Magnetic

Dichloroguanidine
DGM

Methylguanamine with
strong Nitric, ppt from white Sol.
by Nit3 to Anisphosphorus

See Diphenyl-guanidine Hg

Tetraphenyl-guanidine -
K₂ Chromate prodns. pp amorph

Dicyanodideyl-guanidine fits

gun cotton diss in boiling Sal
O Sodium Chloride, +
Cellulose pp by adding HCl.

Hydrox acid K₂ normal
Salt amorph Na salt a
gritty. see table 1023

Heopridene see

Hxchlorethane, see -

~~H~~omocreatine DUM ^{July}

See Humic acid CP - 1943.4
2nd pt 3rd Sup

Diazotyngic acid (diazotyngic)
gives ~~with~~ whole protein of a
humus sub - I tried this but
didn't work well -
See under Humic acids

Tolyl-hydantonic Acid
DUM -

Thiohydantoic acid DUM

Phenyl-diethylazodicarbonyl bromide
DUM

Phenyl-hydrazine Phenyl-Thiocarbonyl
by slow heating DUM at 75°C

2,2-Diphenyl-Thiocarbonyl -

Diphenyl-Thiosemicarbazide
like many all derivatives of
phenylhydrazine are highly
soluble by friction

Hydrobenzamide - from the
Lophine (all) slowly alkyl by ~~alk~~
alcoholates in air the
decomposition gives off light
Shows at X10°C to 50°C
65°C density ceases out and
1063 200 ft 300 500

See p. 1066. 4 line - 2nd pt 3rd Sup.

Indoline - resin

Experiments

Amino derivative of Isatin - with NH_3
sealed tube in Resin

Deoxy-amido-derivative. amorph
brown.

Amaric acid, Resin - colorless
some black at 100°C

Brownish - Ethylisopropyl
ketone with Sodium heat -
1130 middle of prop. 2nd pt 3rd Sup.

Suberone distillation of suberic
acid leaves tarry residue

~~Don~~ Kins Res.

Rosin oil

Ethylene Lactic acid Zinc Salt
white powder

Laurocerasim - amorph

Lepidin - Dichlorolepidin etc
amorph - Oxylepidin - Resin
etc see article on derivation
of Lepidin - great many Resins

~~Tragofurcamine Chloride~~

Amidosapronic anhydride -
white amorphous

Levulinic acid Barium salt
yellow

Lotus bark contains 3 alkaloids,
one Loturine, in dilute acids gives
silicic acid, but in strong acids
gives a white precipitate of
Loturine amorph - the other
2 alkaloids also give some amorph
salt.

Malic acid - alkali salt, of
inactive malic acid, amorph.
all the salts of isomallic acid
are amorph.

Dihydroxymaleic acid
Calcium salt amorph -

Mannite or manital
from products, heating 3
hours with water

Maleic acid - see

Maleic acid - ethyl succinate
waxy mass mp 73°

Mercuric Iodate
amorph.

Methacrylic acid, in
fuming hydrochloric acid gives
amorphous mass

in Red: not entirely fine tar
left in red. C. Mass

Tilloy DEBAMET & Courmiers

France said for some

See p 1305 Methylamine
2nd pt 3rd Sep

Methyl-isobutyl-alcyne acid
gives gummy anhydrides

Benzoyl-morphine amorph

Tetraacetyl-diadene amorph

Diacetyl-codone, 2Thiodide

Good - see Morphine

Acetyl-diadene amorph

See - Myricyl alcohol
good

Myricyl-Hydroxyamine

perfectly amorph wax - m.p. 94

Nitronaphthol black
Resin

Hydroxy-a-naphthylamine
~~black~~ black sub

Nitrohydroxy- α -naphthylamine
Osc to much humd. O. 1368

Narceine, amorph. 11 bottles
with 100% HCl is ~~amorph~~ in
6.25% amorph & form amorph. 11

for Adamant. N₂ in pyrolytes
1 mole sec. Nickel 1389
2nd pt. 3rd sup.

Nitrosocyanilide sec. fit

Octonic acids: Lead acetate
& manganese nitrate give
amorph. ppt

Isocyl-phosphine - wax

Onanthic acid or normal
Heptonic acid see

part relating to Amido benanthylic
acid - DUM good

Amido oils lined Brown
by Chlorine -

See Oxidation - oils Valatile
Especially Turpentine block sub -

Nitro orcinol benalid slowly
DUM -

Vap. Telonide common
deposits Brown in filament
Easily

See p 1460 3rd s. n. amides
give amorph pp with heavy
metals

Oxybenzoin
Bism.

Oxy caproic acid aq Zn c
+ Ba salt amorph

Oxypropylbenzoic acid
Cu Pb salt amorph

Oxyuric acid Bism

Parabanic acid Bism

Nitronitrobenzene, aq NH_3
decolor. it liquefies soon
darkens & then separates
out. See Nitroparaffins.
if it is solid might be squatted
then put in HNO_3

Phenol Ethane -

O-Vinylbenzyl Trans Vitamin

Amidophenols. when with
amidophenol treated with
bleaching powder or soda KO
forming an amorphous
body obtained.

Triamidophenol - see

Bromodeoxychrocin Diene 1000

Peromyscus ~~auratus~~ acid.

Diene Galen 100 1523 3rd

Acetyl. Hest

Nitrophenal turns ~~black~~ brown
at 200° article several things
these some amorph things -

Methylcymendisulphonic acid
Brown salt amorph

Phenylsulfonic acid salts
white amorph

Phenyl-Ketones, passage

Chlorine black mass - 1865 -

Phend-phthalic acid amorph

Amorph is also with Phenol -

Amorph - may be good for

Fluorescein haalid Na hydroxide
+ Zinc dust. Sal becomes
Calcium salt adding acid &
shaking with ether its
discolor & dries up to brown mass

Monoresorcinol-phthalic acid -
RUM strongly

fluorescein may be good base

Orcinol-phthalic acid -
good fits. Evidently

the phthalic acids can be manipulated
as a fits base can be oxidized

Thiobenzophthalic acid RUM
benzophthalic aldehyde -
on mixing it alcohol with
discolor sal KOH
amorph mp 177°

Phthalide converted by
Na amalgam into homymine

Pinelic acid heated with
Bromine + water amorphous product

Podocarpic acid mp 187
resolidifies to amorphous
glass

α -Dichloropropionitrile -
action chlorine on propionitrile
brown amorphous product

Cyanopropionic acid
Amorph brittle Saffers 108
K₂O Salt has solid. Wagon
Salt gummy

$$27 \overline{) 120000} \quad (444 \\ \underline{108} \\ 120 \\ \underline{108} \\ 120$$

$$27 \overline{) 140000} \quad (518 \\ \underline{135} \\ 500 \\ \underline{54} \\ 230$$

$$27 \overline{) 10000} \quad (37 \\ \underline{81} \\ 190$$

Pseudacanthine + allied bases
heating produces acid which
forms amorph salts.

Pseudacanthine salts all amorph
Dibenzoyl-apopseudacanthine
amorph

Acetyl-pseudacanthine all salts
amorph

Hydroxy sorbic acid 1703 3d
Ba Ca Cd salts amorph

Pyroracemic Monoacbamide --
See Nitropyracemic Calcium
Benzene.

see article 1720 action heat
on pyruvic. DVM good

~~Unsymmetrical~~

glutamic acid - mp 73 clear
amorph - 1723

Triacetoquercital, amorphous
do pentaacetoquercital.
1732

Chloromelodoguenic -
readily decarb by KOH or alk
or strong H_2SO_4 - humus -

Nitramelic acid DVM 1741

Colophthatus - several
important reactions on
Calophony fets 5 1 1
1746 3rd

Resorcinol - pargol 7.
p 1747. fets.
+ 9. important.

Dinitrosorcinol salts
amorph

Diethyl-resorcylo-aldol
Pb salt amorph

Resorcinyl oxide amorph
1753

Dresoronyl-dioxide -
amorph

Hydrocyanosamin
D. 1571 - 1762

Corallin - 36 dms. therefore
amorph - 1764 37.

Alcoholic Sol Santonin

Exposed sunlight. amorph
Resinous sub formed

1778 - Something can be done
with this

Sebacic acid Ca salt amorph
Hy salt do

Sebic ether Methyl Sebate Wax
mp 38° but is hard & brittle.

Silico benzoic anhydride diss ether
+ remains on Evap. train
Cover for fets

See Silicis Solubility table -

Sinistrin Amorph

Staphisagrine Amorph
1826

Styracine when heated
Amorph body

Sulphalylacetic acid
See article Many salts Amorph
1841

Sulphotutyric acid
Pb salt amorph

p 1859 - XVI pp Hydroxyldi-
naphthylidiazinesulphonic acid
D-CM lvs. very different
Combustible Carbon

Tetracycl-Coniferin-
trans class as cooling

Tetracyclotribene, amorph
brittle Scales resembling
Colophony

Thioisogalactoside -
amph. Enzymic

Thymohydroxyacetic acid
amph. 1968

Dinitrotoluene treated
with Sodium Ammonium
yields black ammonium

1994 - 2

Bromoparaldehyde-Halaliprimin
DUM -

Or bromotholaldehyde-paraldehyde
DUM 2021

Orthomonotolylarsinic acid

200m arsenic, valent
to my 6' am 2031

Hydrochloride of tripropylarsine-dimethyl
"Violet amorph."

On formation of black liquid residue
Umic sub on electrolyses
of 5% Sol. Hg with Cathodic
Plates made from Carbon
Mistot, Compt Rend - XC 611
Chem Soc journal XXXVIII 482

Veratrum alkaloids ...

p. 2099 - lot anaph + thinal

Zinc chloride exhibits more
shrinkage more than any
known salt properly so
describing more in each than
hot water at 0. C.
dis 30 parts at 100 C
only 0.75-

End of 2nd part 3rd Sup

Now part 1 of 3rd Sup



Sic Aniline black p 89 3rd sup

p-Dinitro-*anthraquinone*
See reaction which gives black
amorph sub. poly Diem -

Meladinitobenzene - reacts
gives black sub - good
Description 3rd 175-

Azobenzene azide Anting
Friedel-Crafts - black amorph
Qual. 2.12 p 3rd
Metallic looking

Melamidobenzene sulphonic acid
See reactions - Diem

Diamidobenzene sulphonc acid
DUM

Di bromo diamido benzene sulphonc
acid DUM -

Amidoperadi bromo benzene sulphonc acid
DUM

Tribromo ~~amido~~ benzene sulphonc acid
DUM

Tribromo elamido benzene sulphonc acid
DUM

Tetabromo amido benzene sulphonc acid
DUM -

233-234 - + more on 235 -

See inside last lining 243 DUM

244 - top lens -

See 245 - bottom 3 lines DUM

See 248 - Chlondo - DUM

See table 257

all above Sulphonic acids
+ appear elegant & brown
to work with.

Benzonic acid - Benzoic or Salicylic
acid - with glucose & sulphuric acid
gently heated - black sub.
See - 259

Azoxybenzoic See whole article
271-5-3rd

upto p 293 —

pt 1 3rd sup

9 leave room to finish
pt 1 + go to 2nd sup

Phenomenon of the lamp.

Electrical Caring -

Lamp brot up very high on pump so as to
break in few minutes if ~~the pressure~~
~~is~~ always breaks $1/4$ inch from
said P. lamp, ~~the pressure~~
~~is~~ ~~at the~~ this with Lampblack
fil - sometimes it arcs but it breaks
at same point just before it arcs -
are pbbly due to Carbon being more porous
giving more Carbon gas -

Lamps which break thus very early
blacken globe below break except on
side not breaking when blackening
is little higher pbbly because don't
go in straight line -

Carbons of Lampblack with Larry
trinder have very little life -
black globe very much -
with some stuff increased pressure
in making filament increases
life enormously & diminishes blacken

Electrical Carrying Current
quite strong.

Central wire connected to sounder
& P wire can work sounder -
no current when Central wire
connected to N wire -

Strength Current increase as
Cp raised, none at Red -

Current is variable, as shown by
unreliability of Cold Volt
indicator Expts -

a pad of tin foil on outside
of globe connected to gal &
other end to P wire gives
continuous current.

This Carrying Current don't go
around a corner,

one test showed lamp having
burned 90 hours gives 17 C
& .54 amp had vac broken &
re-exhausted, Cp still 17
but amp .53 - this probly
shows residual gas was sufficient
accumulated to make a current
of above value -

the platinum wire Neg side
gets black in time when it
goes through glass seal -

Sometimes there are spots on
globes which are not blackened

A 16 cp lamp having apparently
good vac if put down for
3 or 4 hours its very dull
red apparently loose vac
it won't vibrate -

C₁₈ H₁₅ N₃

216 15 42-273

C₃₆ H₂₇ N₅

432 27 70 529

$$\begin{array}{r} 216 \\ 15 \\ \hline 432 \\ 1578 \end{array}$$

$$\begin{array}{r} 12 \\ 18 \\ \hline 36 \\ 18 \\ \hline 54 \\ 18 \\ \hline 72 \\ 18 \\ \hline 90 \\ 18 \\ \hline 108 \\ 18 \\ \hline 126 \\ 18 \\ \hline 144 \\ 18 \\ \hline 162 \\ 18 \\ \hline 180 \\ 18 \\ \hline 198 \\ 18 \\ \hline 216 \end{array}$$

$$273 \left(\begin{array}{r} 216000 \\ 171 \\ \hline 1465 \\ 1250 \end{array} \right) (76.7)$$

$$529 \left(\begin{array}{r} 432000 \\ 4232 \\ \hline 889 \\ 3510 \end{array} \right) (44)$$

$$\begin{array}{r} 432 \\ 27 \\ \hline 70 \\ 529 \end{array}$$

$$\begin{array}{r} 11 \\ 14 \\ \hline 25 \end{array}$$

$$\begin{array}{c} C_8 H_{11} N_1 \\ 96 \quad 11 \quad 14 - 121 \end{array}$$

$$121 \left(\begin{array}{r} 96000 \\ 8620 \\ \hline 1310 \end{array} \right) (71)$$

$$\begin{array}{r} 26 \\ 12 \\ \hline 38 \\ 52 \\ \hline 26 \\ 312 \\ \hline 328 \end{array}$$

$$328 \left(\begin{array}{r} 312000 \\ 2952 \\ \hline 1680 \\ 1640 \\ \hline 40 \end{array} \right) (95.1)$$

$$\begin{array}{r} 12 \\ 20 \\ \hline 36 \\ 60 \\ \hline 420 \end{array} \left(\begin{array}{r} 36000 \\ 3360 \\ \hline 2400 \end{array} \right) (85)$$

$$152 \left(\begin{array}{r} 24000 \\ 284 \\ \hline 20 \\ 52 \end{array} \right) (2.3)$$

$$79 \left(\begin{array}{r} 6000 \\ 553 \\ \hline 475 \\ 39 \end{array} \right) (78)$$

$$\begin{array}{r}
 32 \\
 \underline{12} \\
 20 \\
 \underline{32} \\
 12 \\
 \underline{40} \\
 22 \\
 \underline{38} \\
 4 \\
 \end{array}
 \begin{array}{r}
 384000 \\
 \underline{3654} \\
 18860 \\
 \underline{2380} \\
 16480
 \end{array}
 (94.5-$$

C₂₀ #10 07

240 10 112

$$\begin{array}{r}
 12 \\
 \underline{20} \\
 24
 \end{array}$$

$$\begin{array}{r}
 16 \\
 \underline{7} \\
 112
 \end{array}$$

$$\begin{array}{r}
 240 \\
 \underline{112} \\
 128 \\
 \underline{362}
 \end{array}
 \begin{array}{r}
 240000 \\
 \underline{34} \\
 239966
 \end{array}
 (70$$

plenty of Hydrogen in lamps
free of other gases gives
on a Copper lamp Acetylene
Copper —

files which oxidize in flame
in 7 sec are sometimes better
in Cp & longer life than
those which do not
oxidize in 75 seconds, hence
there is no criterion

A lamp which after
burning 90 hours was
reduced from 38 Cp to 17
gas when put in new globe 22
Cp - showing loss of blackening

Bringing a lamp up high on
pump makes fil difficult to
oxidize when put in flame it
also prevents too great drop
Cp - & probably lengthens
life although latter not
certain ~~as before~~

Some lamps have long life
after short, lamps caught
before they break show bright
spot + under micro read
gradual reduction in size
of fil leading to spot in accn
all rough - ~~hence~~ This is
due to electrical carrying
concentrated there on which with
residual gas rapidly
do the work which is accelerated
by diminution of surface R +
rapid rise of lamp temp

What started it at this particular point is unknown - possibly - peculiarity of surface or original diminished diameter of higher R of which the spot was the apex

No matter how a lamp is made, washed with H₂Cl, N or other gases, globe heated. Clamp heated the spectroscopy shows CO & Hg spectrum above all others,

Bamboo file have 3 times the life. If after half Ct'd they are dipped in asphalt & finally Ct'd -

Yet this process failed after a while from causes unknown - months of Expty couldnt get it back - it was abandoned

The only change that could have accounted for it was that the Bamboo was shipped from Japan from a different source or was different quality or that change in pinning why did it

Low Vac with hanging blue m p clamp globe about blacken. Clamp get sooty, life poor, with little higher Vac one side fil black other side sooty -

Too much clamps were on
surface diminish life of
lamp -

Are formed easily if sparking
Coil flashes are used
around a lamp =

With Bamboo, 10 cp. file
never lasted as long as 16

Life is poor on Zellulose Cone
when 200 Valt - ~~is~~ I wonder
if bad if. Cut to 100 Valt
8 cp -

Upton remembers when lamps
were coming bad we washed
the globes results were many
good then some change took
place & we couldn't get good
results although we washed
them -

Duplicate file one set sent
to Lamp fac for examination
one 8x Lab - Lab was generally
50% + sometimes twice as
good, sometimes Lamp fac
was best,

Req'd factory treated file
shar on other places than where
broke - dark spots as if
Carbonyl are stopped there for
& white when changed to
another spot

also notice gradual taper
towards break - $\frac{1}{2}$ inch -

Carbon pitted ⑫ at point from
the break where flash was
bright were round pits just
as if a disc of flash Carbon
flew out;

Aylsworth says must
give high final alt. in
air comes out in vacuum

Notice most of 50 V Lamps
run on ny Carbons ok
are bit off platinum wire -

Expts show outside of
blackening of globe most
change CP due to change
R in Carbon -

$\frac{1}{4}$ of $\frac{1}{1000}$ surface rendered non
conducting would account for
drop CP by change R -

43 didn't block globe
yet there was great change
Res Carbon - is it internal,
fil was black but where
did Carbon go -

When globe is blue & blue
halo goes from clamps
blue commences flicker then
disappears - now this could

only take place by higher
vacuum - couldn't be heat of
globe as change sometimes
takes hours. Can't be Hg
as I understand it occurs
on mechanical pumps.
Chlorine Vapor run into Lamp
stops blue - blue goes
Spec of Hg & CO,
If higher vac gas must be
absorbed somehow,

The black on globes can
be loosened by hot HCl
it comes off in lumps -
as HCl does it best, what is
reason - is this stuff
Carbon

In Cbg a fil full of ash nearly
all of it goes away in Cbg
furnace this can only take
place after red heat, hence
injury to Carbon - if temp
furnace is not sufficient to
reduce the ash it goes into
fil in Lamp & if worked
high Cp CO will be produced
if K then CO & metallic
K produced -

With ordinary run of lamps
there is no particular spot
where they break as many
break on P as on K side -

with Copper clamps no matter
how dirty they are cleaned
by redrawing action of
Carrying current, not only
P but the negative as well -

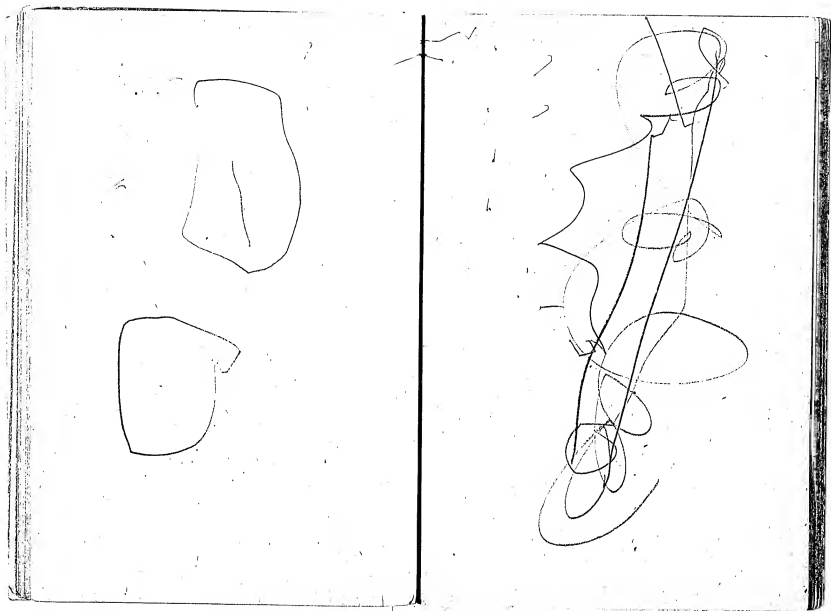
A piece of Coconut shell
Cyl placed in Vac near loop
look broke quickly near the
Charcoal, pblig water

Glass globes have effluvia
pblig soda - or brine head -
wash with hot HCl best
pblig - then rinse distilled
H₂O + then alkalal

When clamps get hot by
bringing up lamp, or pump
it breaks the tube from
decomposing clamp material
make mixture of pbgos with 33 + dipi

As lamps having blue in globe
change after while after flicking
it may be Carbon deposited
on glass may absorb
the gases

Air must adhere to
bdy of pumps then fso
there is a constant bringing
in of air =



The more silvery a film is
on oxidation the better it
holds its Cp =

Noo 35 1902 Storage Bat

Mix 2 graphite, 6 Ni hydrate &
2 H₂O — use for deplyz
in Storage —

Try 3 graphite 7 very fine
Syrian asphalt, deplyz for
Battery Storage? —

Patent acting upon the pure
hard Rubbed by nascent H₂O₂
to eliminate all the sulphur
that it will take out so
it can be used as
Deplyzers in Ni Fe Storage

Nov 3rd 1902 Storge Betty

2nd Sup

See acetamide - action on heating
with Salicylic. sal RO. ^{but} HCl. then
down from glass spongy stuff - strong HCl.
decomp it = p 32

Bromacetic dark viscous mass - poly. fets
Barium salt amorph. -
p 13

See acetic acid in which acetate 15 pgs
fets -

Tetrachloro-diacetic cyanhydric
action C₂H₄ in symmetrical Dichloroacetic
black sub - 16 - "

acetyl - fets 18

Achillein - p 21 - brittle glassy brown
sub -

Napellin p 23 Electric

acridine - KOBichum T504 brown sub 25

agaric species sugar - agaricic
acid BWM - 30

Aldehydes - secretion with phenol
fits - 37

Alidal Viscid mass 39

Alizarin = Isalizarin probably good
for fits - 40

Acortins p 43 - also Stilphenine fits

Allanic acid declm H₂NO₃ on

Allantoin BWM good 43+44.

Allantoinic Acid kind trans
amphimass

Barbaloin - 52 fits

Amaric acid. Ba Pb Ag salts amorph
55

Most powerful Ox^2O_3 -sal

Nitric acid $\text{K}^+\text{O}^-\text{chlorate}$ see

p 69 - anthracene is complicated Ox^2O_3

Bromine in aq. $\text{H}_2\text{O}^2\text{O}_3$ see p 70

See aniline blocks 75 fits

See Sulphoacids of aniline blue
fits - p 77

Anthracene Orange 3rd paragraph 86

Anthracene fused with K_2O gives
large quantity humus sub 86
lasts para 91

Theory No. 1

Breakage of filament is due to quality of surface, lack of smoothness or density or unequal amount of temperature at surface due to uniformity of Carbon, + Carrying does the rest, (15) Proble by Carrying

For - 4 inch frames twisted Carbon are worn down by carrying out distances from the point where they break -

2nd little pieces or lamppole file had no life -

3rd third pieces lamppole show had more life -

8 lamps 54 x 42 put up high - all broke 1/4 mile from point line terminal by carrying

There

Theory 1 continued

9th old bamboo kamps had higher
more than predicted by giving a
 $\frac{1}{4}$ in. of capillary surface -

10th Fredrick Carban had Cp better as
caring is diminished,

All breaks have generally a
long taper part showing it can't
be a flaw or crack as it would not
extend so far

9th It is known that resistance to high
static carrying is diminished by
smoothing & increasing points of
contact

9th We tried kamps with 22 in. away of
Carban under the bed Carban -

10th Working kamps high in weight diminished
conductivity in flames, also the life was
worse and no density must have been increased

11. a fine point on surface from which carrying
goes from can result in carrying
probably up to Volatilization of C to say nothing
of Quantities of CO present. A very
obvious effect of that point is continuous white
to as. saying that all the carrying
points therefrom, if the break -

Many

1

for

12. Lamps having large tunnels or extra
extra tunnels if large surface have no life -
curving inward -

13. filaments from fibres not larvae have
no life -

14. Large Cell fibres like Bacto although
larvae have poor life - paper Carbons
have very poor life -

Many

1 against

page

Heavy flashing has very little new life
which is starting from lamp ends
Some banks full, having a plentiful supply
give several times the life of other
file having same dimensions

10 CP has less life than 16 -

Known spots - lamps sometimes break
at the spot & other times not

in low vac when we side of Pantan
is kept the other place the bank
occurs at any place -

They
against

Crutts Carbon sold glossy dense
deposited and had no life —

N04 fil was poor in force — yet
gave good life —

N08 Surface dull not glossy

$$\begin{array}{r} 18 \\ 26 \\ 3 \\ \hline 196 \\ 21 \end{array}$$

$$\begin{array}{r} 36 \\ 12 \\ 3 \\ \hline 36 \\ 4 \end{array}$$

$$57 \overline{) 216} (3.8 \\ \underline{171} \\ 45$$

$$148 \overline{) 432} (3 \\ \underline{44} \\ 3$$

$$76 \overline{) 288} (3 \\ \underline{208} \\ 80$$

$$\begin{array}{r} 23 \\ 16 \\ 4 \\ \hline 276 \\ 21 \end{array}$$

$$\begin{array}{r} 26 \\ 13 \\ 3 \\ \hline 26 \\ 3 \end{array}$$

$$\begin{array}{r} 24 \\ 16 \\ 4 \\ \hline 24 \\ 3 \end{array}$$

$$23 \overline{) 969} (3.8 \\ \underline{45} \\ 210$$

$$\begin{array}{r} 14 \\ 70 \\ 37 \\ \hline 50 \\ 148 \end{array}$$

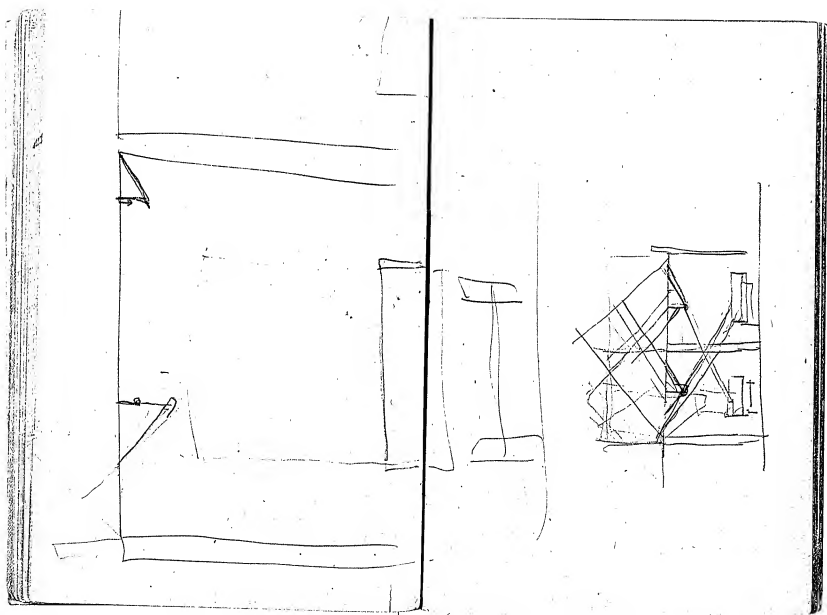
$$53 \overline{) 276} (3.2 \\ \underline{249} \\ 110$$

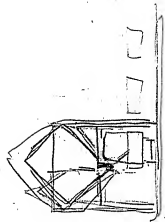
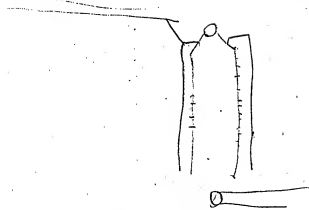
$$\begin{array}{r} 13 \\ 36 \\ 3 \\ \hline 36 \\ 300 \end{array}$$

$$21 \overline{) 72} (3.4 \\ \underline{63} \\ 90$$

$$\begin{array}{r} 18 \\ 16 \\ 4 \\ \hline 18 \\ 180 \end{array}$$

	C	other	limit
96	—	25	3.8
276	—	53	5.2
312	—	47	6.6
72	—	21	3.4
216	—	57	
482	—	148	3.8
144	—	42	3.4
288	—	76	3
360	—	95	3
216	—	108	2





Aniline. 185° BP

Panproline. 260 BP

~~Phenylacetone~~
~~(Benzaldehyde)~~

Ambrosynonitril - mp 52 BP 290

Diamidotoluene " 65 - - 270

46 312

Ambrosynonylamide deg- 253

Phenylpropionitril " 293

Menaphthylamine " above 300

a-Naphthylacetone " 363

B-Diamidodiphenyl " 320

Dipocline, panproline, " 319

Ditolylamine " 370

Triocetylamine " 370

~~Bromonaphthalene~~ in Vac
3 mm mlt at 110 F -

Vapor tension.

Benzaldehyde at 94
has vap. tens in Vac of 75 mm
to a CHO compound

Aniline - at 100 has vap. T of 50

Naphthalene at 100 17

Tetrachloron at 100 1467 mm

— Bromide " 50 mm

Bromonaphthalene at 100 3.6 mm

Xylidine (CHN) at 100 15

Quinoline CHN 106 10

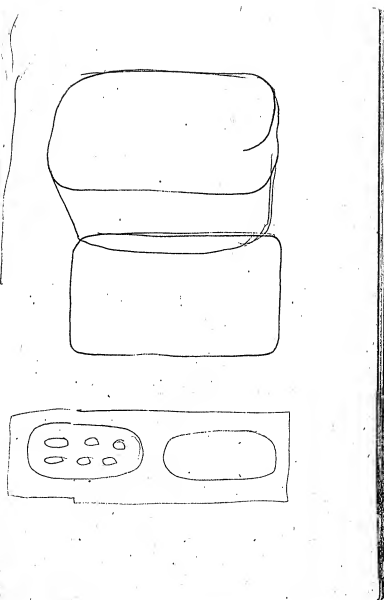
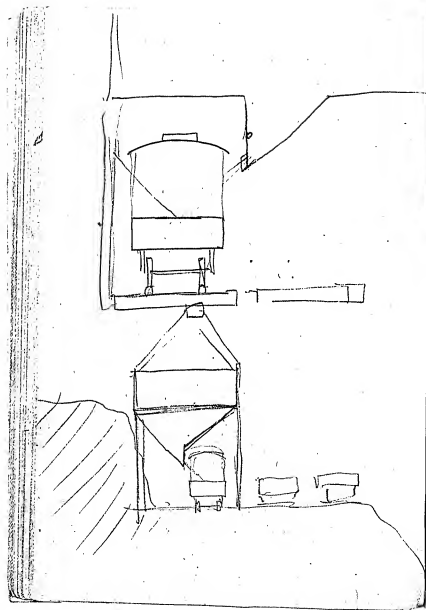
Phosphorus 100 3.44

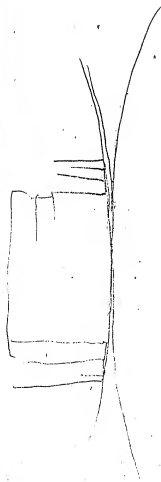
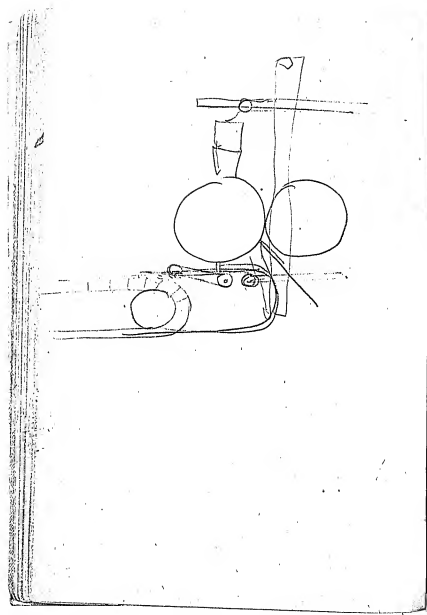
Antimony Triiodide at 153- 1 mm

58 13 at 100 50 m

Iodine at 100 50 m

Carbon Tetrachloride 50 mm 100 50 mm

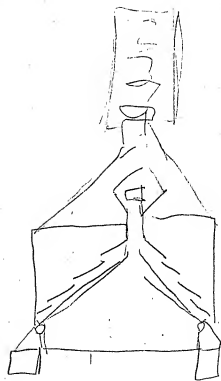
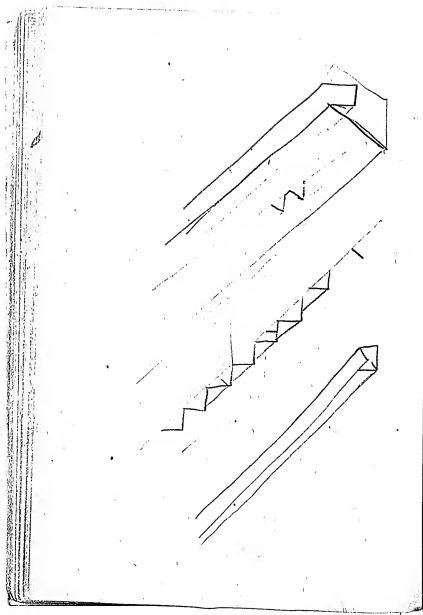


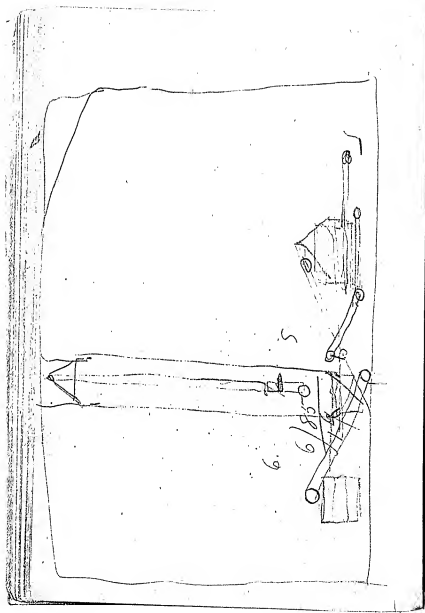
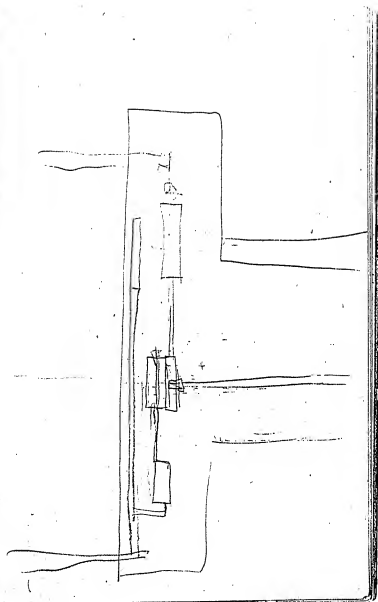


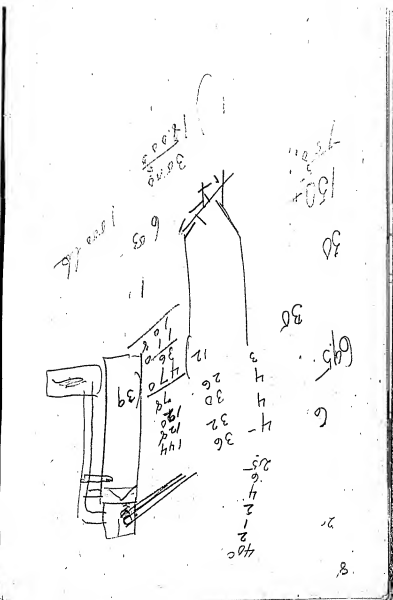
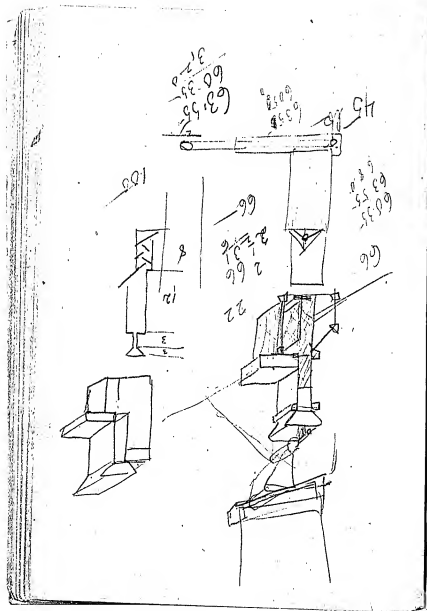


Handwritten notes and calculations on a piece of lined paper:

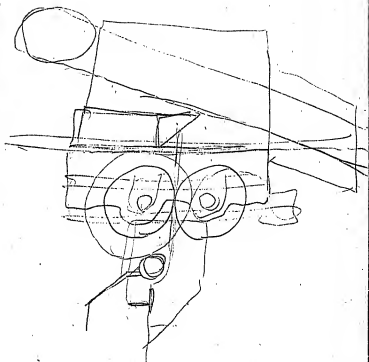
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- Top left: $\frac{10.3}{20.2} = 0.51$
- Center: $\frac{10.3}{20.2} = 0.51$
- Bottom left: $\frac{10.3}{20.2} = 0.51$
- Bottom right: $\frac{10.3}{20.2} = 0.51$



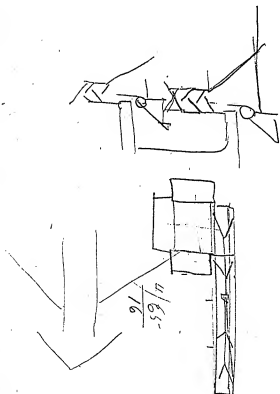


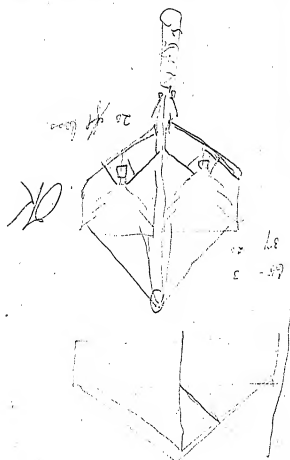


[illegible][illegible]



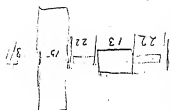
$$\begin{array}{r}
 24 \\
 14 \\
 \hline
 34 \\
 14 \\
 \hline
 48 \\
 0 \\
 \hline
 48 \\
 3 \\
 \hline
 51 \\
 10
 \end{array}$$





Handwritten notes and numbers:

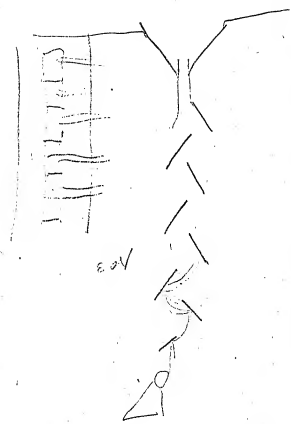
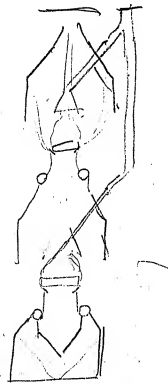
- $66-99$
- 56
- 57
- 150

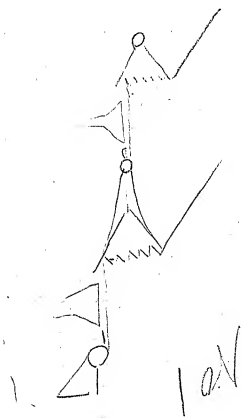
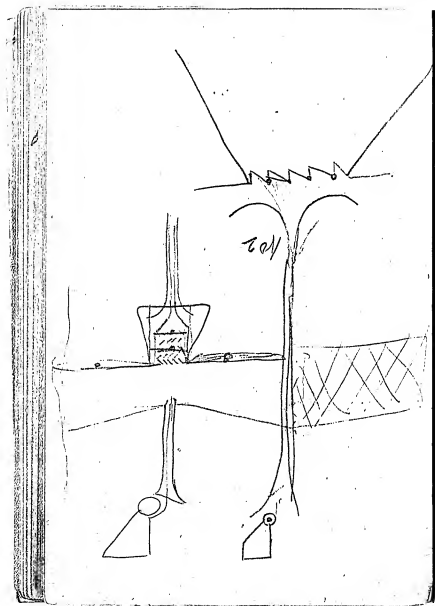


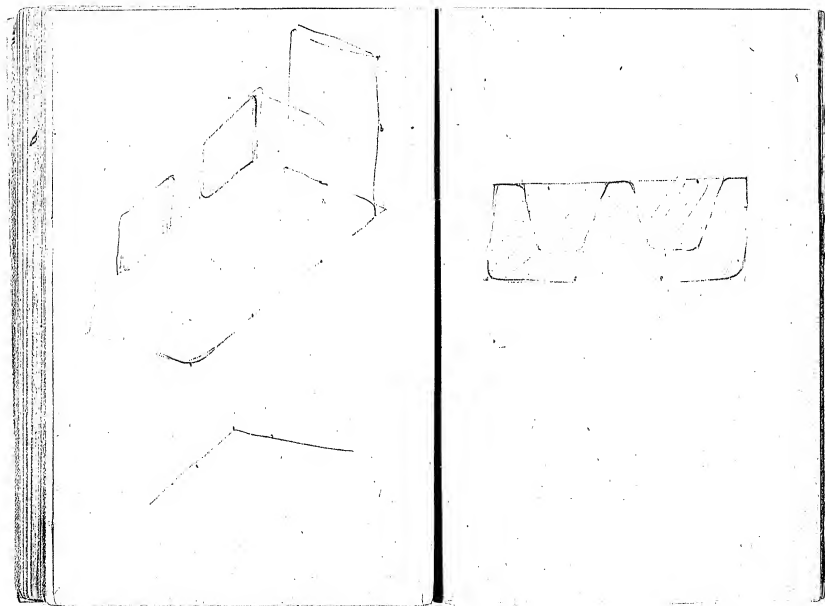
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 48 \\
 14 \\
 \hline
 62 \\
 80 \\
 \hline
 142
 \end{array}
 \bigg| 190.00 (-)$$

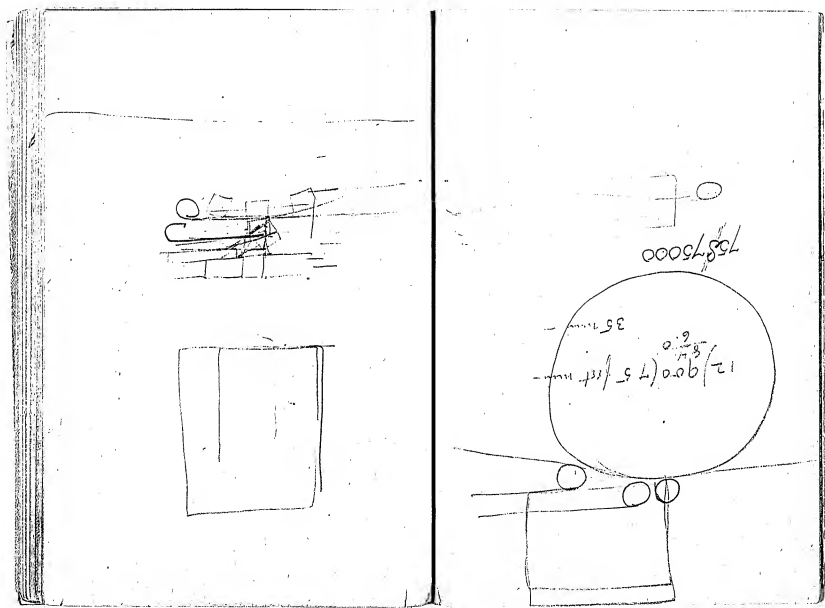
$$\begin{array}{r}
 16 \\
 12 \\
 3 \\
 \hline
 19 \\
 14 \\
 \hline
 217 \\
 90 \\
 \hline
 1958
 \end{array}$$

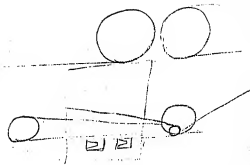
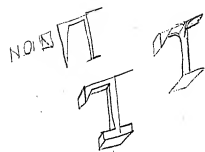
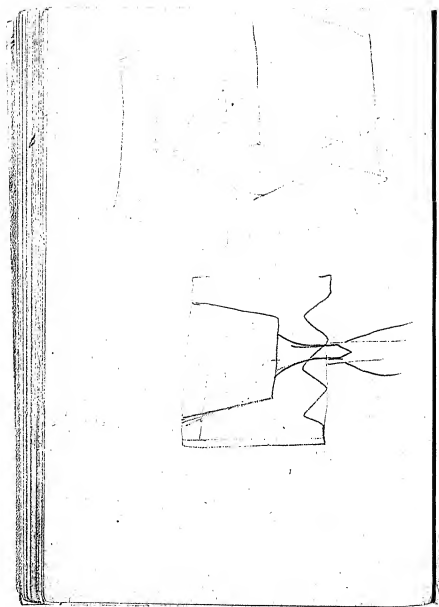
12/1

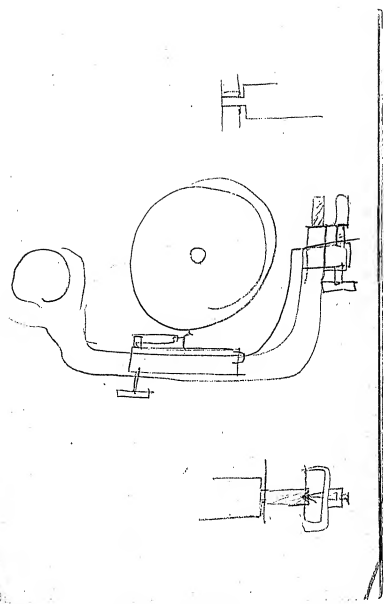
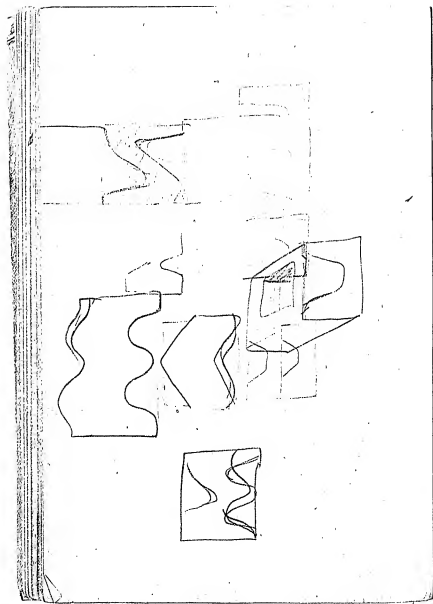


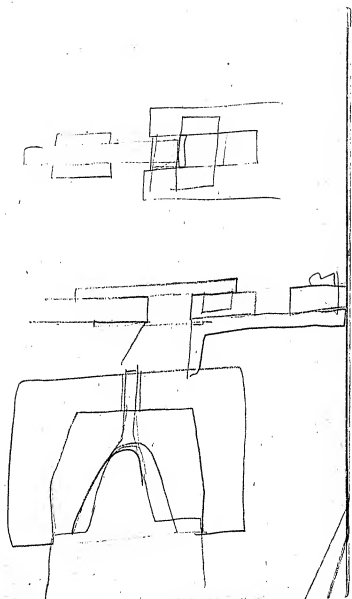
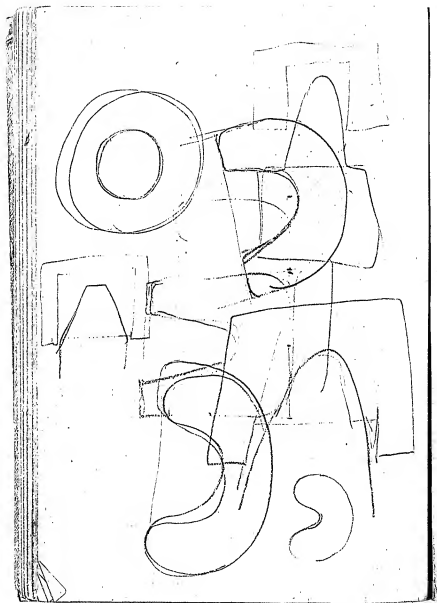


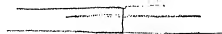
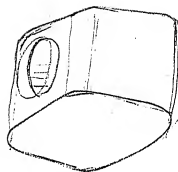










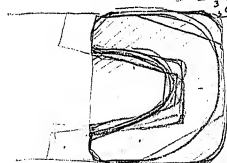


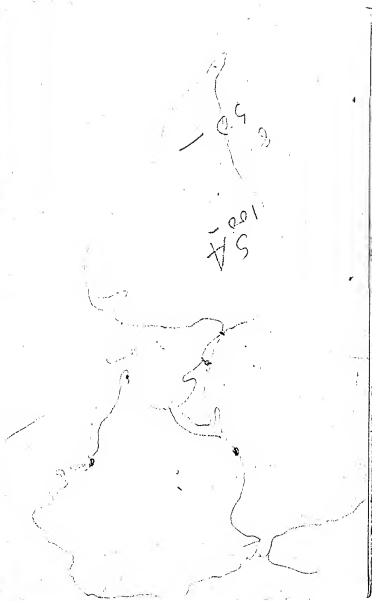
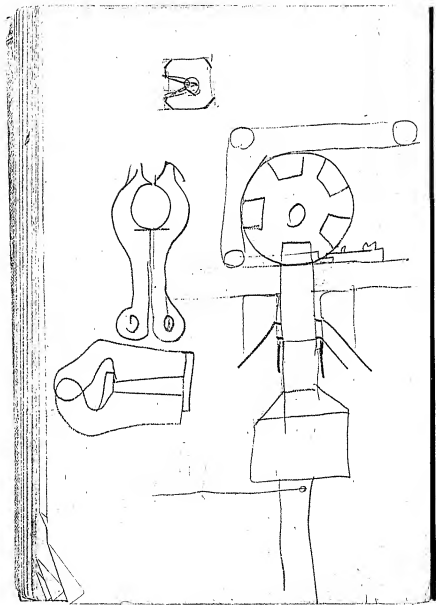
150-
25-
125-

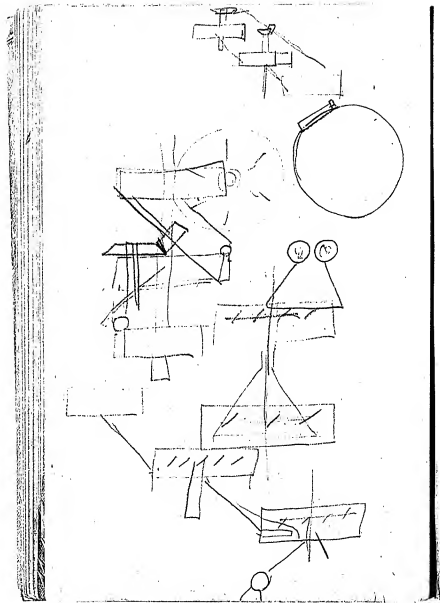
200 ft 160-
500
125-

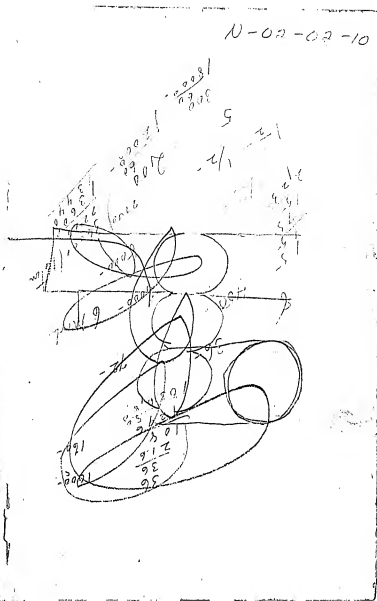
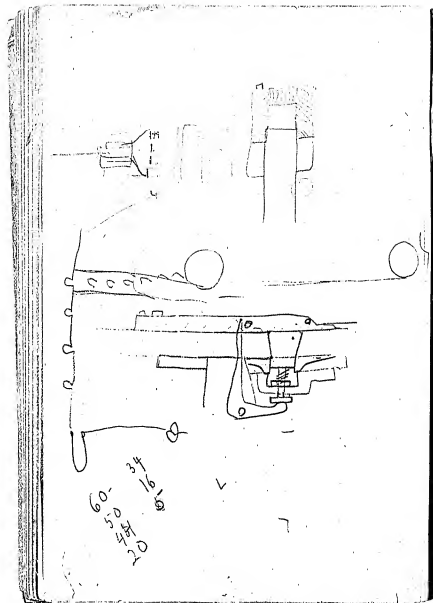


15- 33.00 (22.00)
30
30









Notebook, N-02-10-10

This notebook was probably begun in the late 1890s, although the only dated entry is from 1902. The entries are primarily by Edison. Most of the book consists of numbered entries relating to chemicals or chemical compounds being tested for either squirted filaments or insulation. These entries are most likely from October 1898 and contain a few notations by an unidentified experimenter. Also included is one page of notes on x-ray experiments, possibly from 1896. The one dated entry, from December 1902, is a brief note on a storage battery experiment. At the end of the book are a few drawings of ore milling equipment and phonographs, along with some miscellaneous calculations. The pages are unnumbered, and at least one page has been removed from the book. Approximately 60 pages have been used.

14

2527
2025
500

240
2000
-

11

|||||

800

5-1600
320

All paths water except Oct 2nd/

Oct 17 am

Inoculation all part in from 1644

Working from 15 Oct

N^o 1 Syn 50 cc H₂O 50 cc N₂ 10 grms Syn
none floats, puffs 6 sitting in oil

N

N^o 2 50 cc H₂O 50 cc HNO₃ - 15 grms Syn
scarcely any bubbles, light brown
puffs rather bristly & flange

N^o 3 50 cc H₂O 50 cc HNO₃ - 20 grms Syn
just little brown flange
puffs in oil same as above

N^o 4 50 cc H₂O 50 cc HNO₃ 25 grms Syn

Very small amt brown floccs

Low schlieren sediment such particles puff

Some 50 cent. size each

N^o 5 50 cc H₂O 50 cc HNO₃ 30 grms Syn

N^o 6 50 cc H₂O 50 cc HNO₃ 35 grms Syn

No 7 50 cc H₂O 50 cc HNO₃ 40 grms Syn

No 8 50 cc H₂O 50 cc HNO₃ 45 grms Syn

No 9 50 cc H₂O 50 cc HNO₃ 50 grms Syn

No 10 50 cc H₂O 50 cc HNO₃ 10 grms sebkid. Amos

Can be left for 10 days
puff like white smoke - a b. mal
at first milky then yellow
mal. white crystals
puff like white smoke

Nº11. $50\alpha\text{CHO}50\alpha\text{CCHN}_2$ 15 grms. selected. Amen

Nº12. $50\alpha\text{CHO}50\alpha\text{CCHN}_2$ 5 grms. selected. Amen
Died with glands in stomach
puffed throat and in stomach

Nº13. $50\alpha\text{CHO}50\alpha\text{CCHN}_2$ 20 grms. selected. Amen

No 14 50 cc HO 50 cc HNO₃ 50 parts selected iron

No 15 50 cc HO 50 cc HNO₃ 50 parts selected iron

No 16 Blank No 17 50 cc HO 50 cc HNO₃ } 10 syn
10 HCl 10 HO

Heat and stir with iron
puffs equally

No 18 Same as 17 15 syn

Considerable first black
puffs much

№ 19. $\left. \begin{array}{l} 50 \text{ g HNO}_3 \\ 10 \text{ HCl} \end{array} \right\} 20 \text{ g rama dipti}$

NO_2 50 ccHO 50cc HNO_3
 10 HCl 10 HO
 10 H_2SO_4 10 HO } 10. sym.

12 small brownish fogs - puffing flames
 somewhat Ca. in color in gas puff

No 21. Same as 20. 15 gms Syn.
Mod amt floats - Very small ash
white puffs only little, 1/4 mol in
puffs each in flame.

No 22 same as 20

20 grms syn

Considerably flatter in weight jar

Abnormal. Milky then reddish. No. 22. Syn. light
puffs badly in flame

No 23 same as 20

25 grms syn

No 24 same as 20

10 grms schote. 1.25 grms

No 25 Same as 20

15 grms selected from
red and black partly brownish - 1/2 in

No 26 Same as 20

20 grms selected from

No 27 Same as 20

25 grms selected from

28 50 cc HO 50 cc HNO₃ 10 grms Prime Cu
Mod float - 6 lts before used and prod
float which was - Cts. Mod int prod
residue; this very light yellowish black
runs through - prod puffs in flame later on

29 50 cc HO 50 cc HNO₃ 15 grms Prime Cu

30 50 cc HO 50 cc HNO₃ 20 grms Prime Cu
Prod puffs in flame and prod lot
white ash;

31 50 cc HO 50 cc HNO₃ 25 grms Prime Cu

OW

No 32 50 HO 50 HNO₃ 10 HCl 10 HO 10 grms Prime Cu

Reddish wash it very well - only about 1/2 gr. +
with few more - followed, then with more
no color - white substance came with
mell - scarcely any flake at all
Dont puff in flame awful lot ash -

No 33 Same as 32 15 grms Prime Cu

mod flat, bluish - at base reddish yellow
light & milky at 15°. Dont puff later on

NO 34 same as 32 20 grms Primo Cu

35 50 cc HO 50 cc HNO₃
10 HCl 10 HO } 10 grms Primo Cu
10 H₂SO₄ 10 HO }

36 Same as 35 20 grms Primo Cu

37. 50 HO 50 HNO₃ 10 grams 8 gm 1 day
put in 10 oct out 12th - puff head not
much ash - white - puff head in flame

38 same " 2 days
in 10 oct out 13th - puff head in
in flame

39 same " 3 days
10 oct in out 14
head in flame -

40 same " 4 days
in out 10 - 14th out

41 same " 6 days
put out flame put 17 in 10th
Puff head in flame

42 same 1.9 gms Syn 8 days

43 same " 12 days

44 same " 20 days

45 = small amount of HNO_3
plant water 30. 30 known as
murex + some white soil -
to make black aniline nit

dead egg 54
fertilized

46 = 200 cc HNO_3 200
water 40 g 54 ground
with water in mortar +
put in jar - it was ok being
already with 9 add
24 cc CP HCl -
put in morning 17th out 25th 5pm
that was ground with light yellow but red
milling little should be brown - what mile
over

May be the reason it was not light
coming up there is an account of
HCl or from fact I followed it
without diluting through a series
then washed HCl, then put
whole in new gas. with dilute
& boiled it after boiling all
Com to top & peculiar. Decaying
small gas out.

47 Some CP Amine oil -
about 10 times bulk of water &
CP HNO₃ until all dissolved.
Dissolved water -
Explosion in flame

48 is 40 Sy & 91 thimp 200
HNO₃ 200 cc H₂O 1 week
Heat gives very red. Explosive
its red - Adipic acid - pyridine
dec & then pp HCl still explos
puffing in flame cannot work

49 - ^{shot} H₂O Amine, then CP HNO₃
H₂O clean & then excess acid not
much - should say H₂O 6 times
as much as acid, except enough

50 - New line of Expts all
within apparently failure

perhaps HNO₃ -

20 g old Sy & bottle 200 cc

H₂O 200 cc fuming solution

acid - previously water in

water - previously in this set

this with well mix H₂O acid 40%

50 is often with white
ash - puffs some but not all
marked by No. 1 rapidly
This would show that Lamm
Best dump Sy. is a better
than old Cliff road -

Oct - Monday Oct 24

51 - gubanti out Oct 24
Disabled water 20 gms, 200 cc
of water wet before running
mixed acid & water. passed out
bal hat when gubanti set in
slight form. Very little ash
about same as Sy. of not less red ash
puffs average electric plug not perfect enough or
weak enough and on fast track

52 - Same as 51 but (see note)
only Oct 24
Amov. puffs and ash small
light ash but some Best dump Sy. is a better
in form of loss in 25 - it does produce yellowish ash like
old but does not so to produce good ash
53 Same as 51 but prime Cuban

54 Same as 51 20 gms Best
dump Sy. - out Oct 24
Lamm - good
Very little ash - red ash best of all -
puffs little but when properly mixed, puffs with
great dense smoke - 25 gms
Friday 21 put 53 in for ash check
with about 25 cc of Hydrofluoric
10 am

53 200 cc HCl
10 grms Chlorate K.
30 grms Gulsmit

(24th Oct 6 pm) out 25

Puffs after strong hot meal.
No more ash added than before.
The small quantity of old Sy.
worked good in puff - very stable.
Chl. not so good in puff.
No puff - about 5 mins came off
very little. Reg. small on decompos.
Exclusively Gulsmit is different
old Sy. that old Sy. has
great deal white ash -

56 - Best Lump Sy 40 grms
450 cc HCl CP 200 cc Dist
H₂O 40 grms Chlorate K.
Oct 25th 2 pm in
200 HCl dist at 450 - 6 pm

put out at 450 - that puff bit
absolutely none - there is some Cl
comes off in flame - meal hot comes in

Considerable stiff acid soap
+ Reg small amount of

Very light yellow variegation
Whiteish. Lots of Chloride Crystals
left - Better try variegation
propagation to get more generally
Chloride + HCl + H₂O sol.

Can furnish in 1 day.

Wet the stuff previously & it
don't puff up at top, for reason
as much as say. Think could
use 3 times as much in a jar
per pound surface.

2nd amount of jar -

Washed filling nearly full
strength in 4 weeks
then poured considerable
H₂O, then put in jar with
But 4 - boiled then followed
but 4 afterwards, some cold
H₂O, then little water to
clear water out then in
Considerable quantity that
will for 20 more (clear)
Males red region. It has
then little Chl + furnish
further beautiful & puff into mud

57- Chl but nearly saturated
with Swamp Sy, then poured
Karo fudges 2 1/2 dried, some
part had little, then through it
but now about 2 1/2 and leave it
dry on heater all night.

25th = 2 1/2 part Karo fudges then they
work then mud - other part used dry Karo had
no other - tried some other but no want other
for Chl - must be saturated with Swamp Sy
no fine or only little fine Chl 3 times to Karo

58- 40 B.H. Sy. wet with 4000 water
20 grams Chloride K provided
100 cc Dist water. more =
200 cc HCl Cp =

58- 40 gms Bdry 40 cc water to wet
20 gms powdered Chlorate K
150 cc pure Dist water
300 HCl Cp -

After 4 hours took it out
but notwithstanding it whirled
by hot water & some other color
puff enormously & evidently up
I notice more than $\frac{1}{2}$ of the
Crystals of Chlorate undissolved
Evidently there is not enough Chlor
dissolved & probability is that
the solution must be a little
warmer say 120 Fahr. -

I put it away in bottle before
fully dry of Mal -

(20)

40 Bldy 4000 water to wet
20 gms. Chloro K. powder
50 cc. evap. Dist. water
150 HCl CP -

~~This is~~ 6/1 like 58 but only
pink, bluish, shape of
little macropneumonia would
make it OK -

61.

40 sq. ft. - 40 water to wet
10 Chloritic pebbles
50 cc. water to wet
150 Hef. C.P.

filling -

Make new test when
uniform again -

62 - Floor of black with
some 150 mesh grey cubes
with basal plates. Same as
see of last test to follow
"66"

11
Know repeat 58 g 62 x 61 -
wt Bld Sy - heavy 1 grain 2 cto 1 grain Sy

No 63 100 Holo 100 760 20 grain
Chlorine K worked a little warmer

40 Bld Sy - and did 2 grains
2 grain chl. then 100 760 20 grain
Very great contraction, no puff

character like 58. Except not so light
Color - White 61 - OK -

500 Sy - low chlorine low -
clay, low - chlorine not so
2 1/2 - 63 - 2 grains -

64 - 150 HCP 100 720 20 grains

Chlorine K worked a little warmer
40 Bld Sy - and did 2 grain
chl. after

puffed a little not quite but
very enough action, do
been, mostly 1/2 action

$\frac{1}{4}$ of this lake
 65 200 Hcl 100 H₂O 20 chlk
 white little warm 40 Bby
 added 2 gm chlk af^l
 act. per se 66
 weight 10 gm 3 ore beside
 about 8 used in gelatin spore
 in 2 hours
 Thus 200 Hcl 100 H₂O 28 chlk
 40 Bby

66 300 Hcl 100 H₂O 20 chlk
 white little warm 40 Bby

add 2 gm chlk of Cui
 in 2 hours

Don't puff in heat - shrinks quickly
 green flame abt 1 ft. after 1 min
 not so much combustion as Reg
 not very much red from mal-
 output apparently great
 Very Sal in Chlors - not so good in
 Bby - its King lights Brown
 weight 9 gm 8 chlk gm
 back

67 = 90 grms Silica
400 HCl
200 H₂O

70 grms KClO₃ - 10 grms
added at time - water bath 130

put 10-15 grms Cl₂ in at 440.

Cold - after 3 put in look
out some to test, this was at
530 pm. Then added the 4th

charge of Cl₂ - it puffs up
about 2 inches & is moving

temp water about 130 all time

put in only 60 grms Cl₂

because I took out about 20 grms
or less. Towards end putting
in a charge don't puff it out
1/2 @ 1 inch - at 625 put in
last charge -

Notice that when temp H₂O

outside jar is increased to 170

a small puff out 140 gradually
at 170 - although Cl₂ all

disolved - I think in practice

the proportion should be 20 Cl₂

in 100 of 6 + outside water

100 @ 170 the oxygen Si

+ action quicker - over

67- took it out 725, but
let taken at 640 screw it
ok no puff at all, ~~it~~
Make thin and and
It seems to dissolve perfectly
in Chloro with no agitation
Shrinks greatly, the Carbonyl
Considerable inflamm reaction
Comes off -

It then takes out a great deal of Ethyl
sticks to it or it softens somewhat and
stays sticky - puffs no more than
Fig 67 when wet with Chloro -
The Male Residue seems to contain
good deal ash -

• Tried 3 67 - 1 gram Cam 5 drop
dip - boiled down when thick
put on plate then worked 2 pencils
rubbed got stiff when cooled -
Tried not at all felt perfect
shiny - prof very much - but
am lying in sand or flame
Tried largest Chloro alone 4 gram
67 - boiled to thick liquid got
stiff when cooled - had to work

long time in hand after spade to
start block in outside instead
yellowish one with big & drive
be slowly that can work to to
my stiffness, old Ray drives too
much to do this. The most
the some change with
Chloro that makes a perfect
stick. If Chloro alone fills
with oil, there will be no
trouble.

Another good base S S

[illegible]

68-400 cc water

100 cc CP fuel oil

50 grams Chloral K
after ambient neutralized by HCl
to form Hydrochloride &
added 200 cc of HCl to
acid of Chloral -

~~later with can will be done in 5 min. quarter of hour~~

No 68 acted all night, followed washed
starting with H₂O often. No 68 in
should have got 60 grams stuff. It's
perfectly set in, Gabyolumine only of all
the soluble birds. Trihydroxanthic acid
does fairly well also. Picolin about there
is only one solvent. Picolin is the perfect
Don't puff mean so much when it was
Reg - after first 400 cc of Picolin in
to wash. The dry stuff cartridges shrivel
with out even the four particles swelling
they are just like (empty) birds - It's
possible that these cases could be mixed
with Reg with Picolin to make it
picous & yet have the 68 stuff
Contract with Reg which I think
I will do -

The action of NaOH on Dinitrobenzyl
in MeOH produced a good brown soap
that there is some nitrophenol left & this
I cannot get out by making it more
further expansion of MeOH without better
reduction of can be perfectly reduced
the fine otherwise no will require
Exposure to reduce it properly
The black stuff from pyrogallic & NaOH
exposed to air when poured by water
which worked & I think worked with
NaOH is a perfect brown liquid a perfect
solvent, ash when poured. Nil -
Dinitro stuff or swell much when wet.
But the residue is very small
say 5 @ 7% of original pyrogallic
This could probably be made
dissolved by oxidation & should be
worked up. Think all the MeOH
oil stuff would be got well
be sad. Dipi. Theate pyrogallic
lower with O can be made
OK by experiment some -

Gg - Base probably beyond
the Magnesium in Mead then
add H_2O then HCl , white pp -
then more H_2O - Brown color
thru in the H_2O pps - more pps
by NH_4 filter - then Mead dries
some - If can get clear
of Mead stuff - don't think
pp for - I leave Gg
filter over night -
Gg X is often partial pps only
Mead dries the chloro
which it does perfect
then pp by Mead - and filter

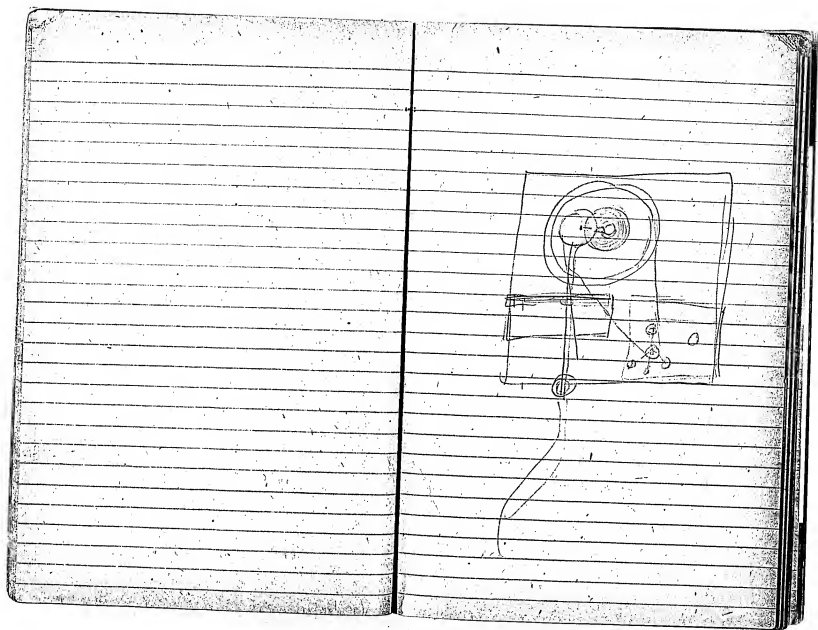
Base

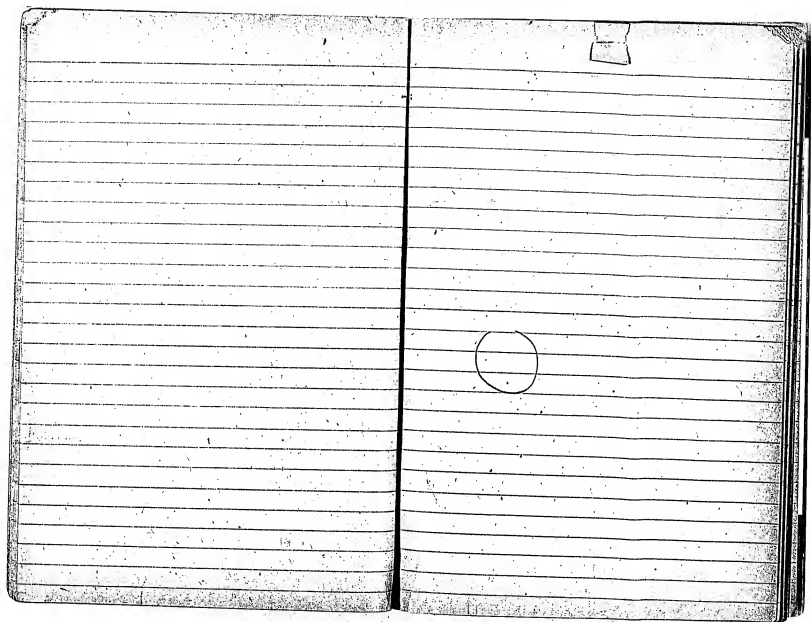
Pyrocarbon + RO around
drip then HCl + Chlorate K -
perfect base -

Base -

Ammonium dichromate oxide by
Current from Grill, then HCl + check

Asphaltum des Chloroform + use
Chloride Sodium just as good
as Reg. only part from the Reg.
disrupt Small of Reg.
good -





$$\begin{array}{r}
 164 \overline{) 980} \\
 \underline{984} \\
 0
 \end{array}$$

$$\begin{array}{r}
 220 \\
 \underline{6} \\
 320 \\
 \underline{20} \\
 300 \\
 \underline{30} \\
 30
 \end{array}$$

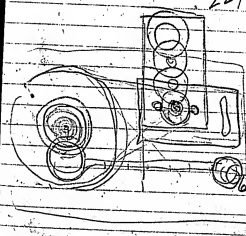
$$\begin{array}{r}
 36 \overline{) 200} \\
 \underline{200} \\
 0
 \end{array}$$

$$\begin{array}{r}
 14 \overline{) 98} \\
 \underline{84} \\
 14
 \end{array}$$

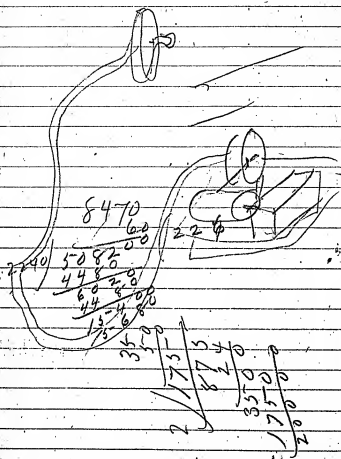
$$\begin{array}{r}
 1150 \\
 \underline{30} \\
 2300 \\
 \underline{200} \\
 2100 \\
 \underline{200} \\
 1900 \\
 \underline{1800} \\
 100
 \end{array}$$

$$\begin{array}{r}
 17.5 \overline{) 900} \\
 \underline{875} \\
 250
 \end{array}$$

$$\begin{array}{r}
 3300 \\
 \underline{4} \\
 32 \\
 \underline{32} \\
 0
 \end{array}$$



$$\begin{array}{r}
 87 \\
 \underline{3} \\
 85 \\
 \underline{36} \\
 50 \\
 \underline{55} \\
 45 \\
 \underline{425} \\
 25 \\
 \underline{25} \\
 0
 \end{array}$$



$$\begin{array}{r} 112 \\ 64 \\ \hline 448 \\ 672 \\ \hline 7168 \end{array}$$

$$12 \overline{) 770} (6,4$$

$$\begin{array}{r} 746 \\ 30 \\ \hline \end{array}$$

$$\begin{array}{r} 112 \\ 80 \\ \hline 89630 \\ 268800 \end{array}$$

$$\begin{array}{r} 77 \\ 110 \\ \hline 77 \\ 77 \\ \hline 8770 \end{array}$$

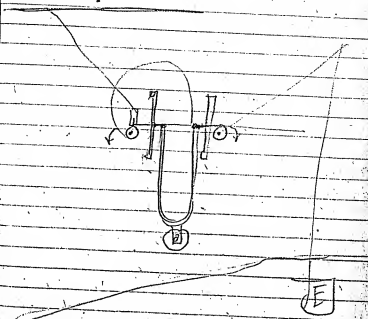
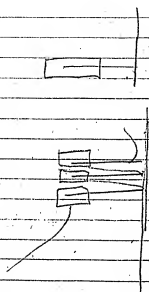
$$\begin{array}{r} 314 \\ \times 36 \\ \hline 1884 \\ 942 \\ \hline \end{array}$$

$$\begin{array}{r} 1728 \overline{) 134400} (77 \\ \underline{12096} \\ 13440 \end{array}$$

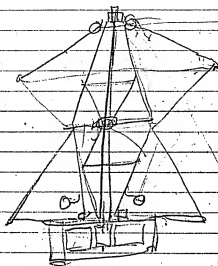
$$\begin{array}{r} 9.75 \\ 12 \overline{) 112.04} \\ \underline{108} \\ 40 \\ \underline{36} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

$$24 \overline{) 1866} \cdot (77$$

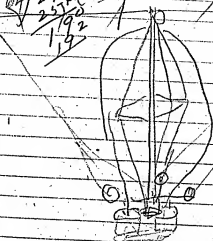
$$\begin{array}{r} 1248 \\ - 1152 \\ \hline 960 \\ 864 \\ \hline 960 \end{array}$$



$$\begin{array}{r}
 1 \quad 60 \\
 60 - m \quad 1 \quad 500 \\
 \hline
 3600 - 1000 \quad 500 \\
 \hline
 3,600,000 - 1,000,000 \\
 \hline
 2,600,000
 \end{array}$$

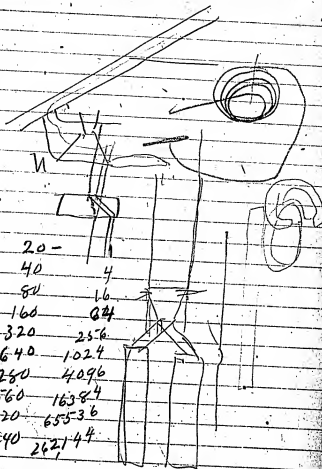
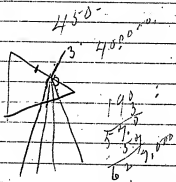
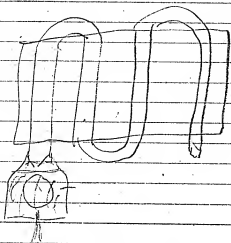


$$\begin{array}{r}
 75 \quad 68 \\
 10 \quad 43 \\
 \hline
 85 \quad 204 \\
 130 \quad 272 \\
 \hline
 260 \quad 272 \\
 260 \quad 432221 \\
 \hline
 273 \quad 150 \\
 256 \quad 72 \\
 \hline
 192
 \end{array}$$



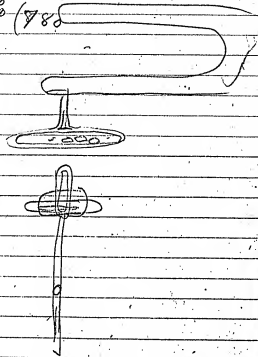
440000

$$\begin{array}{r}
 3 \quad 50 \\
 4 \quad 52 \\
 \hline
 13 \quad 166 \\
 \hline
 13 \quad 166 \\
 \hline
 360 \\
 \hline
 1
 \end{array}$$



20-	1
40	4
80	16
160	64
320	256
640	1024
1280	4096
2560	16384
5120	65536
10240	262144

$$\begin{array}{r}
 5000 - \\
 7500 \\
 16 \overline{) 12500} \quad (780) \\
 \underline{1120} \\
 1380 \\
 \underline{12}
 \end{array}$$



Metlogh - new cylinders - large induction
disc - break wheel. X-ray way
get distance audible with short
Em tubes, break in wires data &
double.

Small vac tube high vac light
by excitation, use. Neel & AgCl.
Util phosphoresces ditto. Nitrate K &
Nit am - platinum Cy Ba + K,
Cyanogenamide of K. Argencyan of Al
rather 80% fluorines also
CalWay =

try tube to end glass rod &
longitudinal vibration with reson
cylth -

Photo each X-ray plate 16 substance
on outside with arc chimney or
crystals with idea that a ray
will pass through opaque
sheet & photo -

try with arc fluorines of all

$$\begin{array}{r}
 315 - 125 \\
 \hline
 190
 \end{array}$$

$3\frac{1}{2}$
 78
 546

335

$$\begin{array}{r}
 78 \\
 \hline
 546
 \end{array}$$

$$\begin{array}{r}
 785 \\
 \hline
 211 \\
 \hline
 785 \\
 \hline
 785165635
 \end{array}$$

$$\begin{array}{r}
 338 \\
 \hline
 85 \\
 \hline
 423
 \end{array}$$

$$\begin{array}{r}
 211 \\
 \hline
 1055 \\
 \hline
 423 \\
 \hline
 106
 \end{array}$$

$$\begin{array}{r}
 1570 \\
 \hline
 33000 \\
 \hline
 165000 \\
 \hline
 15800 \\
 \hline
 88000 \\
 \hline
 158500 \\
 \hline
 158500 \\
 \hline
 71500
 \end{array}$$

$$\begin{array}{r}
 15.7 \\
 \hline
 50 \\
 \hline
 78551
 \end{array}$$

$$\begin{array}{r}
 285 \\
 \hline
 85 \\
 \hline
 3.35
 \end{array}$$

$$\begin{array}{r}
 211 \\
 \hline
 181 \\
 \hline
 14 \\
 \hline
 319 \\
 \hline
 49 \\
 \hline
 52
 \end{array}$$

$$\begin{array}{r}
 785 \\
 \hline
 3.4.5 \\
 \hline
 13.4.62 \\
 \hline
 88.7.25 \\
 \hline
 375 \\
 \hline
 125 \\
 \hline
 41500 \\
 \hline
 1125
 \end{array}$$

111 25 Dec 1902

S Bat

This is a Res but on mixture charcoal
+ the electrolyte of unknown/charcoal
the possible effects R of S Bat on
the graphite - hence try coating
graph with platinum from chloride
by igniting - also plating palladium
+ Nickel by dissolving $\text{Ni}(\text{C}_2\text{H}_3\text{O}_2)_2$
etc.

Try analysis of Ni in grid with
graph or dissolve Hg + then dissolve
that by HNO_3 etc.
Try Ni in the Ni \angle

Reducers: Ferrum Borate, phosphorus
Sulphate, Borate, the ferrum
mixture R. Graphite, the Ni
Neutral Nitrogen

$$\begin{array}{r} 1087 \\ \times 1000000 \\ \hline 1087000000 \end{array}$$

$$\begin{array}{r} 20000 \\ \times 10000 \\ \hline 200000000 \end{array}$$

$$\begin{array}{r} 20000 \\ \times 31200 \\ \hline 624000000 \end{array}$$

$$\begin{array}{r} 256 \\ \times 256 \\ \hline 65536 \end{array}$$

$$\begin{array}{r} 576 \\ \times 2880000 \\ \hline 1658880000 \end{array}$$

576-

$$\begin{array}{r} 312 \\ \times 312 \\ \hline 97344 \end{array}$$

$$\begin{array}{r} 256 \\ \times 912 \\ \hline 233536 \end{array}$$

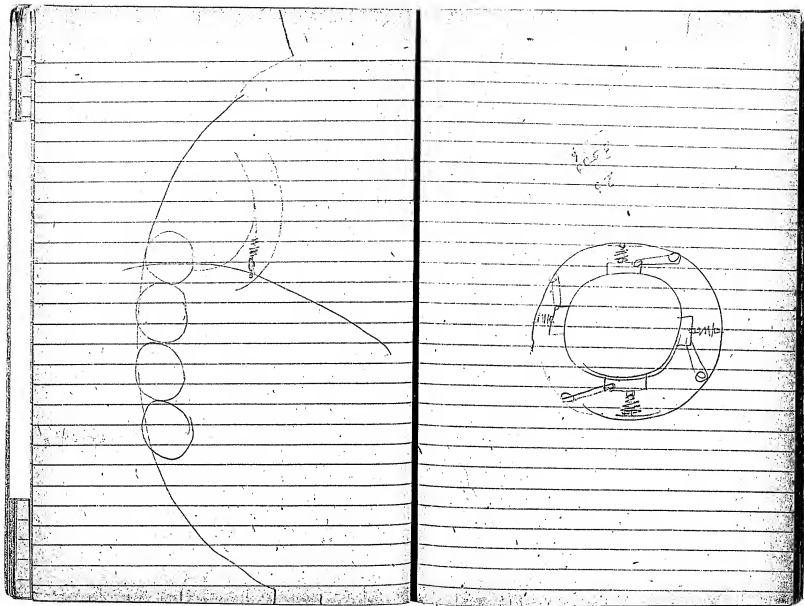
$$\begin{array}{r} 16 \\ \times 16 \\ \hline 256 \end{array}$$

$$\begin{array}{r} 24 \\ \times 24 \\ \hline 576 \end{array}$$

$$\begin{array}{r} 70000 \\ \times 10000 \\ \hline 700000000 \end{array}$$

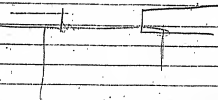
$$\begin{array}{r} 1000000 \\ \times 1000000 \\ \hline 1000000000000 \end{array}$$

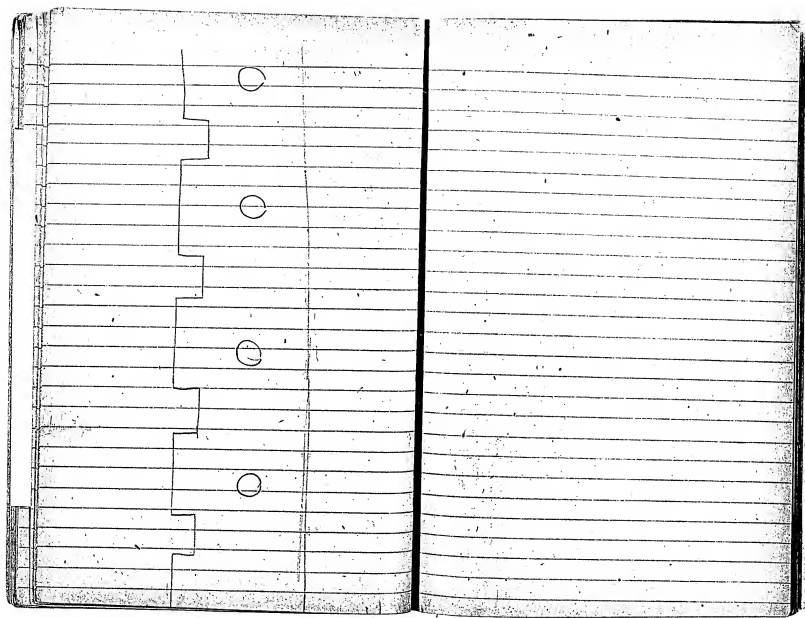
$$\begin{array}{r} 3300 \\ \times 3300 \\ \hline 10890000 \end{array}$$

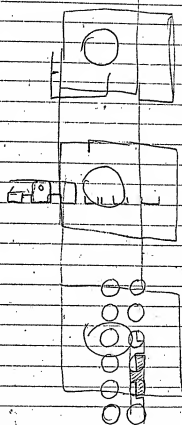
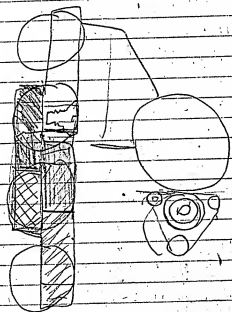


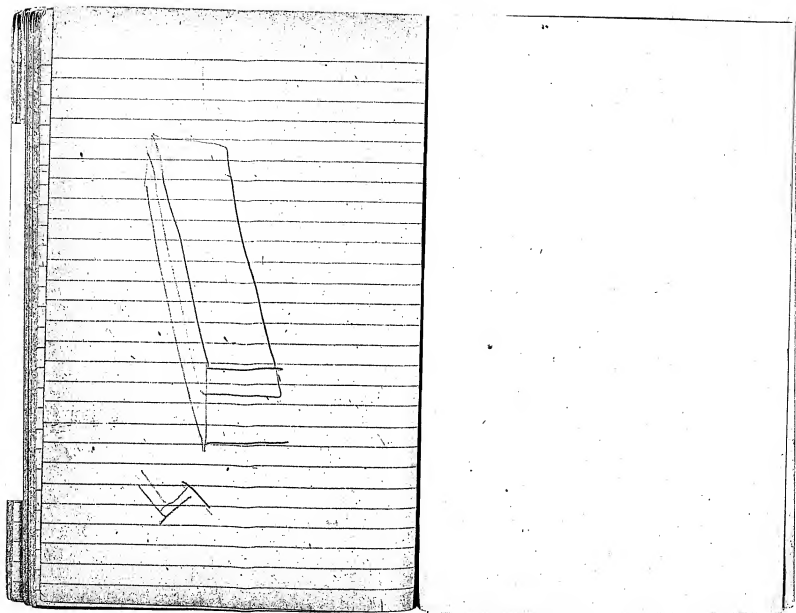
[illegible][illegible]

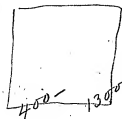
22.005
 22.005
 22.005
 22.005
 22.005



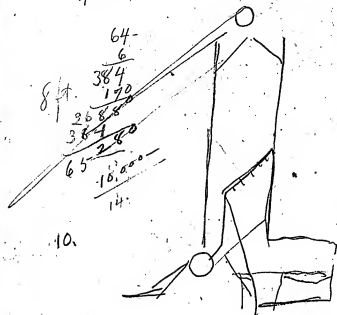








300



15

500-

\$100

12000
1500



60

300



300

350



$$12 \left) \begin{array}{r} 1500 \\ 120 \\ 30 \\ 20 \\ 6 \end{array} \right. (125 \neq$$

N-02-10-10

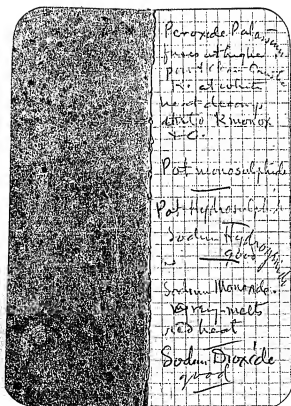
100-

350

500

Pocket Notebook, PN-Undated.18

This undated pocket notebook was used by Edison, probably during the mid-1880s. It contains notes regarding chemical compounds and their reactions to heat. There are also two drawings and one page of miscellaneous calculations. The pages are unnumbered. Approximately 20 pages have been used.



Peroxide Palat

mass at base

Potassium Chloride

Potassium Chloride

Handwritten

Handwritten

Handwritten

Handwritten

Handwritten

Handwritten

Handwritten

Handwritten

Handwritten

Handwritten

Handwritten

Handwritten

Handwritten

Calcium Dioxide
good
poor quality

Calcium Not Susceptible
for Sackcloth - Paper
ypsum good

Stimul. Dioxide
good

Chromic Chromic
Oxide mixed
dioxide of Ca
Chromic Oxide
Chromic Oxide
Chromic Oxide
black powder molten
magnesium CaO

Chromic Dioxide is
soluble in
water and in
alkaline solutions
but not in acids

Lead Chromate
good - high
SO₂

Molybdenum trioxide
fine and bright
good

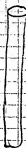
Tungsten
trioxide

Antimony trioxide
" peroxide

Bismuth
Molybdenum
and Vanadium

Pentoxide g

Seal Zone when
heated, decamp
to Sealed Zone
and 4.0
then taking place
3 min. keep on
heating Perox
many



Silver or Copper
Copper (or Silver)
with platinum
by welding
them together
in plate

Nickel ditto

Hydronaut
with tube to
show height
SO₂ in boiler

Platinum or Hf
diaphragm &
glass case
Sloan gauge
perhaps
compensates
do it in
Hydronaut case

on heating to
red heat only the
neutral sulphide
of the alkalies
of the alkaline
Earth & heavy
metals unchanged
at the temp of
melting. The
2 latter classes
are decomposed but
alkaline sulphide
volatile & decomposed
Even Zinc &
Many arsenic
Sulphates are so
difficult to decompose
that - particularly
they are compounds
fully proof

On roasting
decomposable sulphur
yields metallic oxides
Sulphur Dioxide &
O. They are much
more more split
on heating by adding
Smelted Carbon iron
etc.

Phos Acid
Silicic & Borac
acid Expell Sul
a at red heat
Phospho A
boils above
a red heat.

Cast iron is very little
acted on by conc. SO_3
Especially at cold
for many years and iron
would have been
used for boiling SO_3 a
with Silica
- Cast iron is not quite so
very resistant to sulphuric
acid action as little
or least even
it has been used for
pumping etc.

Hutch 143	Roder (Bing)
Bulch 148	gile cpx 397
EH 135	proposed enamel
Tompson 140	Cast iron boiler
Russell 141	indicated in enamel
Chen 142	1 pt powdered burnt
Edson 137	Alum 4 pts Red lead
	2 pts pure silica
	well mixed together
	flashed and cooled
	Use dried powdered
	15 pts of it mixed with
	(water) 20 parts
	Pure silica 4.3
	pts oxide tin
	whole ground up in
	spirit turpentine
	and with soft hair
	brush on the whole
	burned in a furnace
	of brick supported
	over a bed of coals
	and small for the
	burning coal
	burned the

residue for short time
Centrifuge metal &
in metal etc.

Mixture of hydro-
sulfide & Magn-
Sulphate also
oxide - also
Zinc Sulphate &
Sulphate heat see if
Vessels can be
made.

The same experiment
with stronger
Sulphate & heat put
difficult to melt
also Cost in
boat - also
put this in
to Concentrate
see

also in res-
Foot plate & Carb-
to say back out
use phos. analysis
to Concentrate it
by taking up the
see if mixture of
stronger it will
could raise
boiling point &
the gas through
EMF.

see if mixture
of Sulphate
Peroxide & Magn-
boric acid
turn into Sul-
acid

Try in Regua

Sul Soda -

Conk down at

when heated to

Sulphate -

Reacts 644

Nonvolatile (wrought)

Compound is also

very hard & brittle

& water glass the

best thing

of Soda strong

glass -

See if limonite

has

Pyrosulphuric acid

or solid alkali

of Potassium

also get some of

the strongest SO₄

also some

Nonvolatile

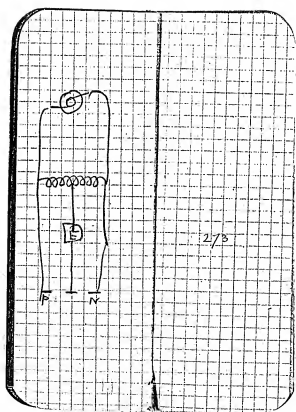
acid

Paint: Lead
peroxide lead
deposited at p
pale as a bluish
black shining
body by electrolysis
of an alkaline
solution of lead
Sodium Tartrate.

12.

$$\begin{array}{r} 27 \\ 36 \\ \hline 162 \\ 81 \\ \hline 12 \overline{) 972} \end{array} \quad \begin{array}{r} 81 \\ \hline 12 \overline{) 160} \end{array}$$

$$\begin{array}{r} 12 \overline{) 160} \\ 53 \end{array}$$



2/3

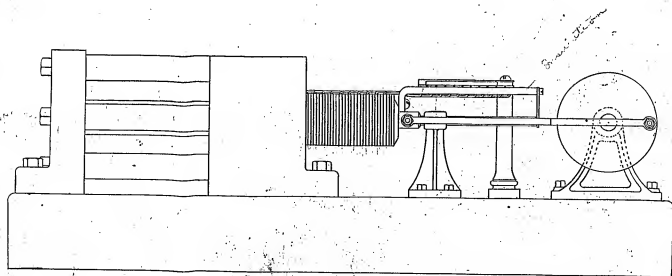
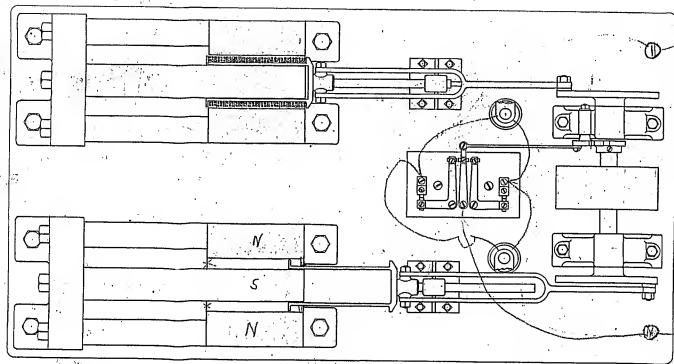
UNBOUND NOTES AND DRAWINGS

1881, 1898

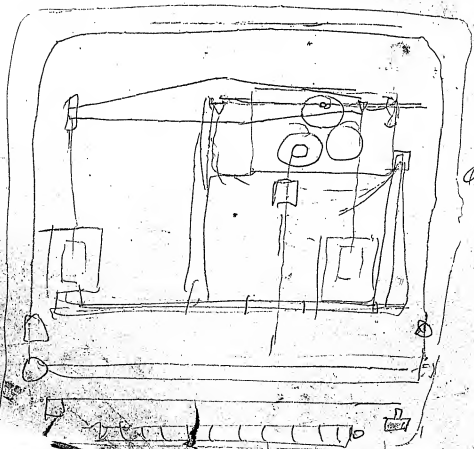
Reciprocating Dynamo for Railroads

Aug. 25. 1881.

J. A. Edison.



Meter



April 1998

John

SUPPLEMENT

DOCUMENT FILE SERIES

1878. Electric Light - Foreign (D-78-21)

[PHOTOCOPY]

(England)
Effinger
July 1, 1878

Thomas Alva Edison
General Morgan & Company

— and —

Episto P. Feltre and
Gennaro P. Loring, Trustees

Agreement

Dated December 31st 1878

9/9/66

[PHOTOCOPY]

Agreement entered into this thirty first
day of December one thousand eight hundred
and seventy eight, between Thomas Alva
Edison, of Menlo Park in the State of New Jersey,
party of the first part; Drexel Morgan and
Company, Bankers, of the City of New York, party
of the second part; and Eugene P. Halse and
Crescent P. Lowrey, hereinafter called the
Trustees, parties of the third part.

Witnesseth:

Whereas the said Edison is
the inventor of certain means for the development
of electric currents and the application of the same
to uses of illumination, power and heating, (which
inventions are more particularly described in a cer-
tain application for letters patent under the great seal
of the United Kingdom of Great Britain and Ire-
land, filed in the Patent Office at London on or
about the day of October, 1875.) and is
prosecuting studies and experiments with a view
to the making of other inventions relating to the
same general subject; and is desirous of securing
the aid and co-operation of said Drexel, Morgan
and Company in obtaining similar letters patent for such
inventions from time to time as they may be made, and
in the financial management, exhibition, and bring-
ing out and disposition of all such inventions in
Great Britain and Ireland, the Channel Islands, the
Isle of Man and such other portions of

[PHOTOCOPY]

British dominions as are or may be included in said letters patent; and is willing to give Draxel, Morgan and Company sole control of the same, and to allow them to retain as their compensation one half of net proceeds, benefits or emoluments which may be obtained by them upon any and all sales or other disposition thereof.

And Whereas Draxel, Morgan and Company are willing to undertake such financial management and control of Edison's said inventions in Great Britain and Ireland, to be exercised whenever they shall be developed to a practical success suitable in their opinion to justify offering them for general use or sale; and, in the meantime, confiding in the skill and ability of said Edison, are willing to provide him the requisite means for obtaining and defending such letters patent, and for exhibiting said inventions on a proper scale, whenever in their judgment such an exhibition is desirable.

And Whereas it is important that Draxel, Morgan and Company should be in a position of absolute security at all times, as to their ability to carry out all such engagements as they may make in the premises, against the revocation by death or otherwise of any power of attorney which might be given them by the said Edison, and for this object it is desirable to place the title to all said inventions made or to be made, and all letters patent which may be obtained therefor in two persons, or the survivor of them, subject to the trusts and conditions herein stated.

[PHOTOCOPY]

And Whereas the Trustees, being requested by both the other parties, are willing to serve for this object.

Now therefore it is agreed as follows:

First: Deziel, Morgan and Company hereby agree to assume the financial management of the said inventions and all of them in Great Britain and Ireland, and all the other places above recited referred to. To give their best efforts and employ the best means and agencies accessible to them to obtain for such inventions or the right to use the same the best price and most favorable terms. To reimburse the said Edison all sums heretofore paid by him on account of the application for letters patent above referred to, not exceeding One Thousand (\$1000) dollars. To assume and pay all further charges incurred or necessary to be incurred in respect to securing or defending letters patent for any invention relating to the general subject matter above described which may at any time hereafter be made by Edison, and generally to assist him in all suitable ways and by all necessary advances, during the period contemplated by this agreement, in obtaining the legal monopoly in said countries to use such inventions, and in exhibiting and disposing of the same to the best advantage.

Second: The said Edison agrees to transfer by an instrument of equal date herewith all the right, title and interest in his said inventions already made, to Regis P. Salbris and Grosvenor P. Lorcey as Trustees, upon the following trusts and conditions: First, to hold the same for the object and purposes of this

1st & 2nd
Quinn

[PHOTOCOPY]

contract, and from time to time by suitable act and deed to assign the same or any part thereof or privilege thereunder to such person or persons and in such manner as may be directed or appointed by Draxel, Morgan and Company: And in case Draxel, Morgan and Company shall have failed to dispose of the principal or controlling invention (being that upon which application for letters patent has been made as above stated) within three years from the first day of July, one thousand eight hundred and seventy nine, then upon demand or writing of Edison, served upon them at any time within six months from the expiration of such period, to reconvey the same to him subject to such outstanding licenses or partial or absolute assignments as may in the meantime have been made in good faith and in a direction or appointment by Draxel, Morgan and Company, but otherwise free and clear of all claim and demands on the part of said Trustees or any persons claiming by, through, or under them. It being the purpose of this provision to give Draxel, Morgan and Company, for the period of three years from the first day of July, one thousand eight hundred and seventy nine, absolute power to dispose of, and secure a good title to, said inventions or any of them, upon such terms, at such times, and in such manner as they may deem best for their joint interest with Edison herein created; and, after the expiration of that period, to give to the said Edison, at any time within the six months above mentioned, and under the conditions above stated, the right to

[PHOTOCOPY]

resume exclusive control over the management and disposition of all inventions remaining undisturbed of and thereby to terminate the power and interest of Deuel, Morgan and Company under this contract.

X
Third: The said Edison hereby assigns, transfers, and sets over to the Trustees, upon the trusts herein provided, all other inventions or improvements, made or to be made by him within the period of five (5) years ending January first, one thousand eight hundred and eighty four, relating to the subject above described, to be held upon the like trusts and conditions, and agrees from time to time, as they are sufficiently complete for that purpose, to make to the Trustees special assignments of each separate invention, and to make prompt application for letters patent upon all such inventions, and upon the issue of letters patent, to assign and deliver the same to the Trustees to be by them held as aforesaid; and further agrees to execute and deliver all such other writings, whether powers of attorney, original conveyances or writings of further assurance as may be requisite to vest a complete title to each and every such invention in the Trustees as the same becomes capable of legal transfer, and further agrees to give concurrently herewith sole and irrevocable power of attorney with power of substitution authorizing and requiring the Trustees in the name of said Edison to grant licenses under and make any absolute or limited conveyance of any such invention made or completed by him.

[PHOTOCOPY]

prior to January first, one thousand eight hundred and eighty four, and not specifically assigned to them for any cause, to persons appointed by Drexel, Morgan and Company who shall have become purchasers of any of the inventions hereby contemplated; granting to such purchasers, in respect to such new inventions, the same or no greater estate, interest or right of use than that owned by them in the inventions originally purchased.

Fourth: The trustees hereby accept the trust imposed by this agreement and the instruments herein provided for, and agree to hold and convey the title of all said inventions subject and according thereto.

Fifth: Inasmuch as the sums of money which may be required under the stipulations of the first clause hereof cannot be presently ascertained, and Drexel, Morgan and Company are unwilling to bind themselves, without reserve, for the payment of indefinite sums, the utility of which cannot be foreseen, and Edison is unwilling to part absolutely with all power over his inventions and at the same time subject himself to the possibility of great loss and injury through misapprehension by Drexel, Morgan and Company of the true value and importance of some particular inventions or of the whole of his system as it may be completed; it is agreed, in respect to all the advances or disbursements herein provided for

(Sixth:) That the same are to be made at the risk of the business and to be repayable, with seven per

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70%
no change

cent, in trust, out of the net proceeds of the sale or disposition of said patents and are not to constitute in any other manner a debt or obligation of Edison.

(Second.)—That Drexel, Morgan and Company shall be the sole judges of the time, manner and degree of expense of such exhibition as shall be made in London or elsewhere in Great Britain.

+ foreign

(Third.)—That whenever Drexel, Morgan and Company shall fail or refuse to advance the sums requisite to obtain or defend letters patent for any invention, it shall be at the option of Edison, within a time specified in a notice in writing to be served by him upon Drexel, Morgan and Company and each of the Trustees—(and which shall not be less than two nor more than three months)—to require a reconveyance by the Trustees to him of all right, title and interest remaining in them in said invention, or, if in his opinion such invention is a necessary part of his general system, then to require in like manner a reconveyance of all his inventions then remaining in the Trustees, and not sold or disposed of or agreed to be, in good faith, by Drexel, Morgan and Company and after the giving of any such notice the interest of Drexel, Morgan and Company in such invention or the proceeds thereof shall cease, but since the stipulation last foregoing is made only to secure Edison against loss and injury arising from the causes above mentioned, and not to give him that power in case of

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honest and intelligent difference as to what is a useful or necessary expenditure in any particular case, it is further provided that upon the receipt of any such notice, Drexel, Morgan and Company may, by notice to the Trustees and Edison, require an arbitration of three disinterested and qualified persons upon the question whether their refusal to make such advances was justified, having in view the interest of both parties as joint participants in the profits of sale as above provided; and upon the decision of such arbitrators in favor of Drexel, Morgan and Company, the notice by Edison shall be held void and of no effect.

(Seventh) - No cancellation of the interest of Drexel, Morgan and Company or termination of their contract hereunder shall impair the obligation of any contract which they may, under the seventh article hereof, have entered into with the purchaser or intending purchaser of any existing invention in respect to the future inventions of Edison.

Sixth - The expenses chargeable to and payable out of the joint account, shall be held to include whatever sums may be expended in applying for, obtaining and defending at law letters patent for the said inventions, the cost of exhibitions in England, the reasonable expenses of said Edison and a suitable allowance for his time should he be required by Drexel, Morgan and Company to visit England, together with the commissions and all other charges customarily incident to the promotion of companies or negotiation of loans in London, but shall not be held to include any share

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or participation in this contract which Drisel, Morgan and Company may deem it necessary or expedient to grant to other banks, financial agents or associates; and all such share or participation will be deducted exclusively from the moiety of Drisel, Morgan and Company.

Seventh: Edison agrees concurrently herewith to constitute Drisel, Morgan and Company his attorney in fact with power of substitution, in his name to sell and convey, and agree to sell and convey, to such persons as may be purchasers of any of his said inventions, a like interest in all future inventions which may be made by or for which letters patent may be granted to him subsequent to the termination of the period of five years above mentioned; the consideration therefor to be ascertained in case of failure by the purchasers to agree with Edison, by arbitrators to be appointed by Edison and the purchasers in a manner similar to that hereinafter provided, it being the purpose of this clause to give Drisel, Morgan and Company a means of assuring to the purchaser of any invention, the title to which is invested or intended to become vested in the Trustee hereunder, the option to acquire a like title or interest in and to all other inventions or letters patent made or issued after the five years above mentioned; and to assure to the said Edison a fair means of determining the price to be paid therefor; and the price, when so ascertained, shall be payable to Drisel, Morgan and Company and to be divided equally between them and the said Edison, on

[PHOTOCOPY]

the case of all inventions for which they have advanced or paid the expenses described in the first article hereof.

Eighth: The term "purchaser," as used herein, shall be deemed to include all persons who by assignment, license, or otherwise may acquire any interest in or right to use any of said inventions. The term "invention" shall be construed to include all discoveries, improvements and letters patent, issued therefor.

In all cases of difference, arising between the parties under this agreement, the same shall be determined by the Trustees, provided, however, that either party may elect, in any particular case, either before or within a reasonable period after the decision of the Trustees, to call for an arbitration by three disinterested persons, and in that case each party shall have the right to choose one, which two shall choose a third, and the decision of such arbitrators upon any question submitted to them shall be final.

Fourth: The said Edison agrees, when requested by Drexel, Morgan and Company or the Trustees, to execute separate instruments repeating the different covenants and stipulations and powers of this agreement separately for more convenient use for filing or public records, or for production in any legal proceeding where it is not desirable or necessary that the interests of the parties hereunder shall be shown. This agreement shall bind the parties of the

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first and second part, their respective assigns and personal representatives.

In Witness whereof the parties hereto have hereunto set their hands and seals the day and year first above written.

Sealed and delivered

in the presence of
Chas. M. Smith

Thomas A. Edison

Dresch Morgant Co

Egbert P. Falck

Brown P. Loring

(See memorandum annexed)

City and County of New York ss:

On this twenty-second day of July in the year 1879, before me personally came Egbert P. Falck and Brown P. Loring to me known to be two of the individuals deputed in and who executed the foregoing instrument and aversally acknowledged to me that they individually executed the same and for the purposes therein mentioned - and at the same time, said Egbert P. Falck, known to me to be one of the copartners composing the firm of Dresch Morgan and Co. and known to me to be the person who executed said instrument in its name, and jointly acknowledged to me that, as such copartner, he executed the said instrument in the name and as the act of said Dresch Morgan and Company and for the purposes aforesaid.

D.S.

John S. Superson

Notary Public

N.Y.C.

[PHOTOCOPY]

Her Britannic Majesty's Consulate-General, New York.



I, EDWARD MORTIMER ARCHIBALD, Esq., COMPANION OF THE
MOST HONORABLE ORDER OF THE BATH, HER BRITANNIC MAJESTY'S CONSUL-
GENERAL, FOR THE STATES OF NEW YORK, NEW JERSEY, CONNECTICUT, RHODE ISLAND,
AND DELAWARE.

Do hereby Certify, That I have reason to believe that the Signature subscribed
and Seal affixed to the Certificate herewith annexed, are the true Signature and Seal of
Daniel Seymour — who was, on the day of
the date of said Certificate, Notary Public, in and for the State of NEW YORK,
duly commissioned and sworn, to whose Official acts faith and credit are due.

In Witness Whereof, I do hereunto set my hand and seal of Office at
the CITY OF NEW YORK, this *eightth* —
day of *March* — is the year of our Lord, and

the said eight hundred and *eighty one*.

For the Consulate-General,

Edward Mortimer Archibald,
Consul.



The proper
execution and

[PHOTOCOPY]

City and County of New York ss:

On this 22nd day of July in the year 1879
 before me came George W. Loren, subscribing witness to
 the foregoing instrument, with whom I am personally
 acquainted, who being by me duly sworn, said that he
 resided in the City of New York; that he was acquainted
 with Thomas A. Edison and knew him to be the person
 described in and who executed the said instrument, and
 that he saw him execute and deliver the same - and
 that he acknowledged to him, the said Loren, that he
 executed and delivered the same, and that he the said
 Loren, thereupon subscribed his name as a witness thereto.

Paul Symonds
 Notary Public
 N.Y. Co.

State of New York,
 City and County of New York ss:

I, WILLIAM A. BUTLER, Clerk of the City and County of New York, and also Clerk of the
 Supreme Court for the said City and County, the same being a Court of Record, DO HEREBY
 CERTIFY, That

whose name is subscribed to the Certificate of the proof or acknowledgment of the annexed
 instrument and thereon written, was, at the time of taking said proof and acknowledgment, a
 Notary Public in and for the City and County of New York, dwelling in the said City, commissioned
 and sworn, and duly authorized to take the same. And further, that I am well acquainted with
 the hand-writing of such Notary, and verily believe that the signature to the said certificate of
 proof or acknowledgment is genuine. I further certify that said instrument is executed and ac-
 knowledged according to the law of the State of New York.

In Testimony Whereof, I hereunto set my hand, and affixed the Seal of the said Court
 and County, the

8 day of

1879
 W. A. Butler
 Clerk.

[PHOTOCOPY]

The foregoing agreement contemplates the concurrent execution and delivery of—

1. A special power by Edison to Drexel, Morgan and Company authorizing them to sell all his interests (equitable or beneficial), in existing and future inventions of the five year period, and letters patent to be granted thereon, and to agree with the purchasers of any invention that they are to have the title to all the like inventions made within fourteen years from date of foregoing agreement; subject however as to inventions subsequent to July, 1884 to a confirmation to be fixed by arbitrators.
2. Power by Trustee to Drexel, Morgan and Company, authorizing them to dispose of Trustee's interest (legal title), and engaging to make over such title as is in them from time to time to Drexel, Morgan and Company's attorneys; and agreeing to exercise the power of attorney given by Edison to them under the last part of the Third Article.
3. Special assignment described in the second Article.
4. Power of attorney contemplated by the last clause of the Third Article, with power of substitution.

Thomas A. Edison
 Drexel Morgan & Co
 C. P. Webb Trustee

1880. Edison, T. A. - General (D-80-04)

New Harmony, Indiana
23 March 1880

Dear Sir

Knowing how very much your time is occupied show certainly, you are besieged by railors & letters, I feared the solicitation of some friend here to address you.

Hoping at the urgent request of W. Pelham, who owns & operates the Telephone route between this place & W. W. W. W., I venture back for him to throw a few questions, which I like to be readily answered without intruding too much on your time.

He is anxious to know whether you are already prepared to dispose of Territory for your Electric Light & whether or not you would sell over more of the lands, so that he could become familiar with the working of the apparatus.

If I understand correctly he would have difficulty even if you sent him a sketch, in obtaining the required vacuum ^{for the} ~~for the~~ having a sufficiently porous

* unless this can be procured even during the winter.

ballooning; although he has a number of the ground-balloons which he used before the war was changed from the balloon to the telephone system.

Looms connected for 15 years with the State University, as Prof. of Ast. Science, had the pleasure of giving lectures, with fine illustrations of phenomena, from Prof. Barker just before he met you in Colorado. One of our Prof. - J. A. Taylor, of Physics, also met you on that occasion & spoke of the pleasure he had in seeing your device for obtaining the best astronomical view - a telescope.

Before the war (in which Looms Col. of an 8th Regt.) he was being State Geologist of this State, after the death of my brother Dr. David Dale Brown, State Geologist of Ky. state. I had served 9 years as Prof. of Ast. Sc. in the State College which finally became part of the University of Nashville, Tenn. While there, I published a work on ballooning, a copy of which I take this day of sending you by to-day's mail. Through Prof. Wright of the U.S., then our Minister to Russia, I sent a copy to Prof. V. Humboldt who had the pleasure of two autographed letters in reply. While not fully admitting the whole generalization therein attempted, he acknowledged many of the laws as discovered & others have been done since in this field's work. During the 20 years which have since elapsed, although I have found reason to modify some of the views, the main laws have been confirmed. Looms thereby led to direct with the Galvanometer the direction relation

strength of the so called currents of electricity in
the earth's crust, & proceeded to construct my
electrical globe, which shows with a small
bichromate of potass cell, all the general
phenomena of the declination & inclination
of the needle.

I am still busy with original research
in Terrestrial Magnetism.

Wishing you entire success, especially in
your present great problem of giving to the
world a beautiful, cheap, & scientific light,
hoping you may long enjoy good health
& promote scientific discovery.

I am

Very truly yours

Richard Owen

2 Mar 24.50

Dr. Richardson
New York, N.Y. Mar 23.50

1881. Edison, T. A. - General (D-81-04)

[INCOMPLETE]

T. A. EDISON,
OF FIFTH AVENUE.

New York, 20th Nov 1881
Harry Bentley Esq
Phonograph Co.

Philadelphia:

Dear Sir

I have your kind
favor of 12th inst
for which accept my
best thanks. As soon
as the whole of the
your communication ^{is} before
me I shall be
very glad if you will
obtain me a copy

Yours truly

Thomas A. Edison

P.S. Since writing the
above I have recd
yours of 25th inst

1881. Electric Light - Edison Electric Illuminating Company
of New York (D-81-22)

[PHOTOCOPY]

Memorandum of Agreement made this twenty-third day of March

In the year of our Lord, one thousand eight hundred and eighty one, by and between The Edison Electric Light Company, hereinafter called the Light Company, party of the first part, and The Edison Electric Illuminating Company of New York, hereinafter called the Illuminating Company, party of the second part, each being a corporation duly organized under the laws of the State of New York, witnesseth:

Whereas the Light Company is by virtue of a certain contract, with Thomas A. Edison, the owner for the United States of certain valuable inventions and Letters Patent upon inventions of Thomas Edison for the United States, having reference to the production and general distribution of electricity for light, heat and power; and is entitled by such contract to all the inventions of the said Edison, relating to the same and, for the same territory, heretofore made, or which hereafter may be made by him within the period of five years from the twelfth day of January 1881; and in witness of contracting with responsible parties for the use of the said inventions in the manner and to the extent hereinafter provided for, in certain stations, sections or parts of the City of New York, or in the whole of said City, as may hereafter appear; and

Whereas the Illuminating Company is a corporation duly organized for the purpose, among others, of acquiring from the Light Company the right to use the said inventions of the said Edison in the City of New York, or in certain parts thereof, as aforesaid, and in witness of making contracts for the business and purposes herein set forth, and has agreed with the Light Company to promote the introduction of the said Electric Light System owned by the Light Company in the City of New York or certain parts thereof, as hereinafter appears: It is agreed as follows:

First. The Light Company hereby agrees to license to the Illuminating Company the sole and exclusive use in two certain stations, sections or parts of the City of New York, which are more particularly set forth in another part of this instrument, all the inventions and Letters Patent of Thomas A. Edison now belonging to the Light Company, or which may hereafter come into its possession within the period of five years from the twelfth day of January 1881, under and pursuant to two certain contracts heretofore executed between the Light Company and the said Edison bearing date respectively the thirteenth day of November 1880, and the twelfth day of January 1881, reference to which is herein made; and the Light Company agrees to execute and deliver to the Illuminating Company a license, in the form hereto annexed and marked *Exhibit A*, and such other or further license or licenses as the Illuminating Company is entitled to under the terms of this agreement, securing such sole and exclusive right of use, but subject to all the conditions stated in this agreement, and also containing terms forbidding their assignment or transfer, it being the agreement of the parties hereto and the intention of this agreement, that this agreement shall not in any way be assignable or transferable by the Illuminating Company, and that any license which may be executed by the Light Company pursuant to this agreement shall not contain anything in any way whatever entitling or empowering the Illuminating Company to make any assignment or transfer whatever of said license, or any part thereof, but only to make such sub-licenses to its customers as may be by such license permitted.

Second. This agreement to license as aforesaid does not authorize the two by the Illuminating Company of any of the inventions of Thomas A. Edison so far as they relate to the propulsion of railway trains or the furnishing of power for railway trackage, but allows the use of such inventions and patents only so far as they apply to the production and general distribution of electricity for light and heat, also for power for domestic and industrial purposes. It is further agreed that nothing herein contained shall in any wise entitle the Illuminating Company to use or have any interest in or direction over the use or control of the said inventions so far as they may be used for the propulsion and distribution of electricity for light, heat and power on steamships, sailing vessels, ferry boats and marine craft of all kinds, whether the same are registered as of New York or otherwise, the Light Company hereby reserving exclusively the right to deal with all kinds of marine craft, both in the City of New York and elsewhere, as regards the said inventions, with the same force and effect as if this agreement had never been made.

Third. The two stations, sections or parts of the City of New York referred to in the first paragraph are as follows, *viz:* First, one station or section located in the lower part of the City of New York, bounded on the East by the East River, on the West by the middle line of Nassau Street, on the North by the middle line of Spruce Street, and on the South by the middle line of Wall Street; and, second, a station or section of the same area as the said first station, but located in what is known as the upper portion of the City of New York, the same to be hereafter bounded as may be agreed upon between the parties hereto. The boundary of the said first section may hereafter be modified on account of convenience or economy, or for other good reason, by and with the consent of the Light Company.

Fourth. Whereas the Edison System of Electric Lighting, referred to in this agreement, necessitates the subdividing or breaking up of the area of the City of New York into a large number of sections, or stations, the number of about thirty-four below Seventh Street in said City, two of which are above described; and whereas it is the intention of the Light Company to hereafter license the Illuminating Company to use the said Edison System in all of the other said sections or stations of the City, provided the Illuminating Company shall exploit or introduce the said System in said other sections of the City with reasonable rapidity: It is agreed that the Light Company, which, under this agreement, at present licenses the Illuminating Company to use the said System only in the two sections above described, will hereafter license the Illuminating Company to use the said System in all the other sections or stations in

1881. Electric Light - Edison Electric Illuminating Company
of New York (D-31-22)

(PHOTOCOPY)

the City of New York as aforesaid, provided the Illuminating Company, if the Light Company shall so desire, shall occupy and equip at least four of such other stations annually, beginning October 1st, 1881, and shall introduce the said System into as full and general use in said stations as possible, with due diligence; it being hereby agreed that such occupation and equipment of said stations shall be uniform, as regards extent of plant and appliances of all kind appertaining to the Edison System, with the plant and appliances of either or both of the first two stations above described, as the same shall have been approved by the Light Company. If the Illuminating Company shall fail or neglect to exploit the System in the remaining sections of the City as above set forth, viz: at the rate of four sections per annum, (unless such default be caused by the Light Company), the Light Company shall have the right to license any other party or parties, to the exclusion of the Illuminating Company, to occupy and equip any remaining station or stations not already fully occupied and equipped as herein provided for, and further shall have the right in all respects to treat and deal with the said other party or parties, as regards said remaining sections, with the same force and effect as if this agreement with the Illuminating Company had never been made.

Fifth. The Illuminating Company agrees to pay to the Light Company for the agreements, rights and licenses hereby given, 35 per centum of all stock issued by the Illuminating Company, of which 10 per centum shall be paid to the Light Company in cash, at the time of such stock, and 25 per centum in fully paid up stock; and it is hereby agreed that whenever the Illuminating Company shall issue any or all of its present stock, and as fast as it shall issue the same, and whenever it may hereafter increase its stock and make issue of all or any part of said increase, and as fast as it shall issue the same, the Illuminating Company will pay to the Light Company a sum in money equal to 10 per centum of cash and all of said issues, and also issue to the Light Company 25 per centum fully paid up stock and every issue of stock as aforesaid, to the effect that of every one hundred shares of stock issued by the Illuminating Company the Light Company shall be entitled to and shall receive 25 shares of said stock, fully paid, and in addition thereto a sum of money equal to the par value of ten of said shares. Should the Illuminating Company in making issues of its stock permit payments thereon in installments instead of requiring payment in full at once, it is agreed that the Light Company shall accept its 10 per centum of cash compensation above provided for, as fast as, and only as fast as, the said payments in installments shall be made, provided however, that in no event shall a subsequent issue of stock be made until the payments on all prior issues shall have been made in full, and provided further that whenever any issue of stock is made the Light Company shall promptly and without any postponement whatever receive its 25 per centum of fully paid stock of such issue, as above provided for.

Sixth. Inasmuch as it is deemed by both parties important that at the beginning of the introduction of the Edison Electric Lighting System, and for some time thereafter until the Light Company shall otherwise direct, the preparation and installation of the plant required in each and every section or station should be under the responsible control and direction of the Light Company, in order to insure for the time being the benefit of all the experience of the Light Company, its officers and employees, it is agreed that the Light Company, acting as the agent of the Illuminating Company, shall, for its account and at its expense, give orders for and obtain, purchase and pay for (with money to be furnished by the Illuminating Company) all machinery, lamps, material, incense and appliances that may be necessary according to the specifications and requirements of the Light Company for the complete preparation and installation of the plant required in each and all of the sections or stations herein referred to; it being however understood and agreed that the Light Company, acting as agent as aforesaid, shall make no charge for its services, and shall not make or receive any profit whatever as agent as aforesaid, but shall be reimbursed its actual outlay and expense, incurred in connection with such services, including payments to employees for wages; and it is further agreed that as regards the lamps required by the Illuminating Company, the Light Company shall furnish the same at the price of 35 cents each, or at their actual cost if always that price.

Seventh. If at any time hereafter it shall, in the opinion of the Light Company, be for the benefit of both parties to this contract that the Illuminating Company should give its own orders directly to manufacturers, and should itself become a purchaser of plant, or any part thereof, it is agreed that the Light Company shall supply the Illuminating Company with all requisite drawings, specifications and models completed and perfected so as to enable the Illuminating Company itself to contract directly with manufacturers, and not through the intermediaries of the Light Company for the manufacture of the requisite parts of a complete plant; but in such case it is agreed that no change whatever shall be made by the Illuminating Company in any part of said System without the consent of the Light Company, and also that the Light Company shall, through its officers and engineers, have the right to supervise the manufacture, seeing that up and installation of any and all plants or parts thereof thus obtained, to the end that no interference, or disturbance of the general System of Electric Lighting of the Light Company as the same is now perfected or as the same may be hereafter changed or improved in the future, shall be made, but that the said System as a whole and in all its details shall be under the exclusive and entire control of the Light Company; and in no event shall the Illuminating Company ever use in any part of its plant, or in connection with any part of the System of Electric Lighting herein provided for, any machine, method, material or appliance, different from or additional to those furnished or authorized by the Light Company, without first obtaining its consent in writing. But it is further agreed that the Illuminating Company shall pay to the Light Company the actual cost of the services of engineers, draftsmen, and other skilled labor required in making drawings as aforesaid, or in superintending the installation of plant as aforesaid, provided such charges shall be at the rates customarily paid for services of like character.

Eighth. At the present stage of development of the Edison Electric Lighting System it is impossible for the Light Company to state otherwise than approximately the cost of a plant for a section or sec-

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then, but it is the judgment of the Light Company, acting in good faith, and as the Illuminating Company, and desiring so far as may be afforded in advance every possible information, that the cost of the plant for each of the two sections or stations above specifically described, will be as follows, viz: the cost for the plant of which is called the down-town station, exclusive of a building to be occupied for the boilers, steam dynamos, et cetera, will be about \$250,000, and the cost for the other, or up-town station, also exclusive of said building, will be about the same amount. The losses of machinery, lamps, material and appliances constituting each of said plants and the cost of the same as far as can now be known by the Light Company, are set forth in detail in a schedule hereto annexed, marked Schedule No. 2, for the down-town section, and marked Schedule No. 3, for the up-town section; and it having been hereto provided that the Light Company will act as agent of the Illuminating Company to give orders for, purchase, and pay for the said plants, it is hereby agreed that the Illuminating Company will in advance of giving orders deposit with the Light Company the estimated cost of the same as just as such deposit shall be required by the Light Company, it being understood that the Light Company shall not exact from the Illuminating Company as already larger advance payments on account of said plant from time to time than in the best judgment of the Light Company may be necessary to secure itself from loss in connection with the said orders. It is further agreed that if the cost of the said plants should exceed the estimates as set forth in the schedule, or should any change be made hereafter by the Light Company, or under its direction, whereby the cost of said plants shall be increased, the Illuminating Company shall bear the cost of such increase, and furnish the money to pay for the same, provided as if such increased cost and such changes and modifications had been originally set forth in this agreement and in the schedule or schedules hereto annexed.

Ninth. The capital of the Illuminating Company, which is now fixed at \$1,000,000, shall not be increased without the consent of the Light Company in writing, and without the issue and delivery to the Light Company of its property of said stock together with the cash payment as above provided for; but nothing herein contained shall prevent the Light Company from disposing of its stock in the Illuminating Company from time to time, either in whole or in part, should it ever so do so, as to the Light Company shall seem best.

Tenth. As additional compensation for the benefits granted by this instrument to the Illuminating Company, it is hereby agreed that the Illuminating Company's Board of Directors shall always contain two directors who shall be nominated by the Light Company, and shall be elected by the stockholders of the Illuminating Company, and it is further agreed that one of these two directors, to be designated by the Light Company from time to time as it may think best, shall always be a member of the Finance or Executive Committee and of all other committees of said Board of Directors of the Illuminating Company.

Eleventh. The Illuminating Company shall not mortgage its property or securities any real or stock interest without the consent of the Light Company. Whenever money is needed from time to time to increase the number of sections or stations, and to occupy and equip the same, such money shall be procured by increasing the capital stock of the Illuminating Company and shall not be obtained either by borrowing or by using the earnings of the Illuminating Company for said purposes, without the written consent of the Light Company.

Twelfth. The Illuminating Company shall on the first days of January and July of each year, severally, make a full report, verified by oath of the officer first designated with the details purporting to be given in said report, of the losses of the Company for the next preceeding six months, and the Light Company shall have the right to prescribe a form or forms for such reports; and the Light Company shall have the right at any reasonable time and by authority of its Board of Directors or Executive Committee, to examine the books and accounts of the Illuminating Company, and the latter shall on demand of the Light Company always furnish every reasonable facility for such examination.

Thirteenth. The Illuminating Company shall not purchase any patents affecting the Edison System of Electric Lighting in any of its details whatsoever, nor shall it obtain any license for or under any such patents, without first offering to the Light Company the right to obtain such patents or such license, for the use of all its licensees, at the same price and upon the same terms as the same can be obtained by the Illuminating Company. If the Illuminating Company should purchase or obtain license under any patent or patents without first offering the same to the Light Company, as aforesaid, the Light Company and its assigns and licensees shall thereby ipso facto become fully licensed to make use and vend the inventions described in such patent or patents during the term or terms thereof, and the Illuminating Company shall also be liable for any charge arising from the failure to first offer the same. If the Light Company either fails or declines to avail itself of the privilege of purchasing such patents, inventions or licenses, within ten weeks after such offer is made by it, the Illuminating Company may then purchase the same, but it shall in no event use the same in connection with its business of furnishing light, heat and power without first obtaining the written consent of the Light Company.

Fourteenth. The Illuminating Company agrees that it furnishes light, heat and power in actual operation. It will exact from its users cashless issues (exclusive of physical) as the Light Company may require.

Fifteenth. The Illuminating Company admits and acknowledges the validity of all of the Letters Patent for inventions either now or hereafter owned or controlled by the Light Company, and the validity and enforceability of the inventions therein described and claimed, and agrees that it will not in any way share or interfere or contest either the validity of any of the patents that it may be licensed to use pursuant to this agreement, or the sufficiency of their specifications, or the validity of the title of the Light Company to said patents or any of them, and it encourages others to do so.

1881. Electric Light - Edison Electric Illuminating Company
of New York (D-81-22)

[PHOTOCOPY]

Sixteenth. The Light Company assumes and reserves to itself the right to prosecute and defend all suits affecting the validity of its patents, and will upon notice from the Illuminating Company prosecute all infringements of said patents in the territory covered by this agreement, wherever the Light Company, having in view its interests in said inventions and letters patent in other portions of the United States and elsewhere shall deem it judicious and proper to do so; and it is hereby agreed that whenever any action affecting the patents of the Light Company shall be commenced against the Illuminating Company, or shall come to its notice in the regular course of its business, the Illuminating Company shall immediately and without delay notify the Light Company of the same, and if the Light Company does not elect to prosecute and defend any suit commenced against the Illuminating Company, or to which the Illuminating Company shall be a party, affecting the validity of the patents of the Light Company, the Illuminating Company shall then be free to do so, subject however to the general control and direction of the Light Company should the latter from time to time choose to exercise such control.

Seventeenth. In case the Illuminating Company refuses or neglects to perfect, or withdraws any of the conditions or provisions of this agreement, and especially any of the provisions contained in either the sixth, tenth, eleventh, twelfth, thirteenth, fourteenth or fifteenth sections, the Light Company shall have the right to terminate this agreement at any time, and upon the giving of such notice and the expiration of said thirty days this agreement and all licenses that may have been granted under it shall be *ipso facto* voided; and all rights granted by this instrument, or by any license granted under it, shall revert in the Light Company free and discharged of this agreement and the said license.

Eighteenth. It is mutually agreed by the parties hereto, that this agreement provides only for a license or right to use the inventions and letters patent to which it applies, and the machinery, lamps, material and other means and appliances embodying such inventions or covered by such letters patent; and does not give to the Illuminating Company, or provide for, any right to vend, or any right to make, any such machines or other apparatus aforesaid, otherwise than as herein provided, the same to be used only according to the license hereto annexed.

Nineteenth. This contract, subject to the terms and conditions thereof, shall continue in full force and effect during the life of any or all of the patents which the Illuminating Company is licensed to use under or pursuant to this instrument, or which it may hereafter be licensed to use by the Light Company.

Twentieth. The agreement of the respective parties hereto and the conditions hereof shall also bind and inure to the benefit of the successors and the assigns of the Light Company and of the successors of the Illuminating Company.

In witness whereof the said The Edison Electric Light Company, party of the first part, and the said The Edison Electric Illuminating Company of New York, party of the second part, each has caused these presents to be subscribed by its president or one of its corporate officers and to be hereunto affixed and attested by its secretary, the day and year first above written.

(Witness in duplicate)

Attest C. S. [Signature]

The Edison Electric Light Company
by Norris Green
President

The Edison Electric Illuminating
Company of New York

Attest C. S. [Signature]

by [Signature]
Vice President

1881. Electric Light - Edison Electric Light Company (D-81-26)

[PHOTOCOPY]

1881-oct-30
Edison Elec. Co. Agreement
1881

N.P.S. Cat # 945

Agreement
between
The Edison Electric
Light Company
and
Miller F. Moore.

[PHOTOCOPY]

Agreement made this thirteenth day of April 1881, by and between The Edison Electric Light Company, of the City of New York, hereinafter called the company, party of the first part, and Miller J. Moore, of Roselle, Union Co., New Jersey, party of the second part. —

Whereas the company is the owner of certain patents for electric lighting, and proposes to establish a Bureau for the introduction of its system of electric lighting in isolated buildings, and certain isolated localities hereinafter described, which Bureau may possibly be hereinafter transferred to a separate and independent corporation, under such terms as the company may hereinafter prescribe: —

And whereas the company having confidence in the said Moore in his ability, energy and judgment, proposes to place him in charge of said Bureau: —

Now this Agreement Witnesseth, —

First: The said Moore shall be and hereby is appointed the head or chief of the Bureau of Isolated Lighting of this company within the United States, and has special charge of the introduction and soliciting for the introduction of the company's system of electric lighting into the Isolated Buildings and Localities situated within the United States. —

Second: It is agreed that what is meant by Isolated Buildings and Localities within the contemplation of this agreement is as follows, viz: —

1. Buildings outside of gas limits, that is to say: beyond and outside of the area where gas pipes are now laid. —
2. Such buildings within gas limits as may be, for special reasons, considered by the company as isolated, or which may have been excepted from any district. —
3. Small towns and villages of not more than one thousand.

[PHOTOCOPY]

inhabitants, or where the inhabitants shall not exceed five hundred square miles. —

Third: The said Moore on his part agrees to devote his entire time and attention to the business of the said Bureau, and to use his best efforts in effecting the installation of the Company's system with rapidity and economy; also to design or cause to be designed, under his supervision, all necessary machinery; also to superintend, by himself, or by others for whom he shall be responsible, the installation of the Company's system into the said isolated Building and Localities, and further to conduct the business to the best of his ability, so as to make the same successful mechanically and financially, it being further understood that all contracts made with consumers and otherwise, under this agreement shall be made in the name of the Company, and only by express authority of the Company, and that the terms and conditions of the same shall be entirely determined by the Company, and that the financial details of all business connected with said Bureau shall be under the exclusive management of the Company. —

Fourth: No expenses shall be incurred by Moore for office rent, assistants, employees, or other expenses, without the approval of the Company. But it is understood that Moore shall himself have the selection and appointment of all assistants and employees in his Bureau, subject, however, to the approval of the Company. —

Fifth: Whereas this business of isolated lighting which the Company now propose to establish is new and untried, so that the Company cannot foretell whether it may be for its interest to continue to conduct the said business as a Bureau of this Company, or to transfer the same in whole or in part to an independent Company or Corporation to conduct the same independently of and apart from the Company; and whereas the Company may hereafter decide in some instances to turn over to local companies, (which may be hereafter established) certain plants or installations

[PHOTOCOPY]

actually completed by the said Moore, and whereas it is important that the Company should not be restricted or embarrassed in making said transfers, but should have the right to do so without being obliged to obtain the consent of said Moore: it is hereby agreed that the Company may hereafter make such transfers or changes regarding the ownership and management of the said Bureau out of the business therewith connected, including all plants that may be installed pursuant to this contract, as to the Company may seem best and proper: provided that in the case of any such transfer or withdrawal, the said Moore shall be entitled to a continuance of his compensation regarding the plant or localities so transferred, in the same manner as in case of a termination of this contract by the six months notice herein provided for: but it shall be optional with the Company, in such case or cases, either to continue to the said Moore the said compensation or to pay him a round sum within three of such sum to be fixed by Moore and the Company, or if they cannot agree, by an arbitrator to be mutually agreed upon. —

Sixth: The compensation to be paid by the Company to the said Moore under this contract shall be as follows: viz: a salary of \$6,000 per annum payable in monthly sums of \$500 each at the end of each month: and, in addition thereto, a commission of 5 per centum on the net profits of the business of said Bureau while under the management of Moore as aforesaid; after deducting from the gross receipts of the Bureau, all rent, salaries (including Moore's salary), wages, costs and expenses connected with carrying it on.

The accounts between the Company and Moore shall be made up once in every three months, viz: On the first days of January, April, July and October of each year. Should this contract be terminated by the death, misconduct or disability of said Moore, he shall not be entitled to the said salary after the date of said termination. Should it be terminated by the six months notice as provided for in the ninth section of this agreement, Moore's salary shall terminate with said six months: but, in any event, he

[PHOTOCOPY]

shall be entitled to the said commission for one year from the date of the said termination, and no longer; it being however understood that the basis of all commissions for the said one year shall not include the new or increased business and plants of the said year, but shall include and be limited to such business and plants as shall have been actually installed and lighted up under this contract at the date of the termination of the contract as aforesaid. —

Tenth: It is agreed that if Moore himself make any inventions or obtains any patents relating to the business or subject matter of the Bureau, he shall either sell the same to this Company, or shall license this Company to use the same for such price as the Company and he may agree upon. Should Moore himself make any inventions, as aforesaid, due allowance shall be given by him in adjusting or determining the said price for any assistance, suggestions, or advice that he may have had in making his inventions, from the Company, or any of its officers or employees. And if the Company and Moore are unable to agree, the price shall be fixed by an arbitrator to be selected by mutual consent. It is further agreed that Moore shall not have any interest in any invention not belonging to himself, in anywise relating to the business of the said Bureau, or to the system of electric lighting of this Company, and Moore hereby agrees that he will in good faith act as the agent of this Company without further compensation, to procure for the Company so far as he can on the best possible terms, any and all inventions and patents which may be made or owned by other persons in anywise relating to his Bureau or any part of the system of Electric Lighting of this Company, provided the Company shall desire to become possessed of the same. —

Eleventh: — Moore shall not while in the employ of this Company or while drawing any compensation of any kind from it, render any services whatever to any other party

[PHOTOCOPY]

engaged in the same business as the Edison Electric Light Company. Nor shall he enter the service of any party carrying on the same or similar business, or render any service whatever to such party within a period of at least one year from the date of the termination of this contract, provided the Company is willing to pay to Moore the commissions as provided for in the eighth section of this contract.

Fourth: Either the Company or the said Moore may terminate this contract upon giving six months written notice, but otherwise it shall not be terminated except by the death, misconduct or permanent disability of the said Moore.

Fifth: Inasmuch as it is impossible for the parties of this contract to foresee the best development of the business of the Bureau, and as it is the desire and intention of both parties to adjust any new or disputed points that may hereinafter arise, in such way as may be mutually just and proper: It is agreed that any and all questions that may hereinafter arise, touching the construction of this contract, or affecting the joint and several rights and interests of the parties hereto, shall, in the event of the Company and Moore not being able to agree about the same, be referred to an arbitrator to be agreed upon between them.

Sixth: Whenever arbitrators shall be demanded by either the Company or Moore, both parties shall in good faith join in the selection of the same, and it is further agreed that the questions to be submitted to the said arbitrator or arbitrators shall be stated in writing, by the person demanding the arbitration as aforesaid: and a copy thereof shall be duly furnished to the other party. Should the parties hereto fail to agree upon an arbitrator, said question or questions shall be submitted to three arbitrators instead of one, and said three shall be appointed as follows: Each party shall name one, and the two thus selected shall appoint a third: And it is

[PHOTOCOPY]

agreed, that any and all decisions made by any arbiters provided for in this instrument, shall be final and conclusive as between the parties hereto, and be binding upon the same.

The agreements of the respective parties hereto and the conditions hereof binding each of them shall also reciprocally bind and inure to the benefit of their respective successors and assigns, in Wifredo whereof the said Edison Electric Light Company, has caused these presents to be subscribed by its President, and its corporate seal to be hereto affixed and attached by its secretary, and the said Moore has hereunto set his hand and seal the day and year first above written.

Witness my hand and seal the day and year first above written.
 The Edison Electric Light Company
 Edward Secy by Walter W. Moore

Witness my signature of
 W. F. Moore
 A. H. Moore

W. F. Moore



Copy of Miller F. Moore's contract
 with the Edison Electric Light Company
 donated by his granddaughter,
 Helen Moore Murphy May 11, 1965
 Roselle, New Jersey

Received - 1965 May 12

1881. Electric Light - Foreign - United Kingdom (D-81-33)

[PHOTOCOPY]

N ^o 1	England
<i>Thomas A. Edison</i>	
- to -	
<i>Edison, Morgan & Company</i>	
Power of Attorney	
Dated March 1, 1881	

(4021)

[PHOTOCOPY]

Whereas, by an instrument dated December 31st 1878, made by and between Thomas A. Edison, of the first part, Drevel, Morgan & Company of the second part, and Egist. P. Habris and Bronner P. Leroy, as Trustees, of the third part, the said Edison did consent and agree to give to Drevel, Morgan & Company control and power to sell or otherwise dispose of certain inventions made or to be made and letters patent therefor, granted or to be granted, in and for Great Britain and Ireland, and other places, all as is more particularly set forth in said agreement of December 31st 1878, to which, for greater certainty, reference is hereby made —

Now, in execution of certain provisions of, and subject in all things to the terms of, said agreement, and, particularly to such terms thereof as relate to the extent and limitation in respect of time of the interest in such inventions and patents which may be acquired by Drevel, Morgan & Company thereunder, I, Thomas A. Edison have made, constituted and appointed, and do hereby make, constitute and appoint said Drevel, Morgan & Company, and the said firm as it may be hereafter constituted and the legal surviving partners thereof at any time during the operation thereof, my true and lawful attorneys, privy and sole for me and in my name to take all proceedings and to make and sufficiently execute and deliver all writings necessary to secure in my name, or in the name of my assignees, as they may be compelled by law, or may be able in their discretion and determine to do, letters patent in and for Great Britain and Ireland, the Channel Islands, the

[PHOTOCOPY]

Sole of Man and such other portions of the British Dominion as may be included in any such letters patent for all my inventions, discoveries, improvements or devices of or relating to means for developing of electric currents and the application of the same to uses of illumination or power or heating, being such inventions as are more particularly described in said agreement of December 31st 1878 which I have made or may make before January 1st 1884. Subject however to such limitation and determination of the interest of said Drexel Morgan & Company in such inventions and patents as are provided in said agreement of December 31st 1878, and to sell all the right, title and interest, which I may at any time hereafter have in all or any of such inventions or letters patent aforesaid, or undivided or other interests therein or rights of any character thereunder, or to grant license or other rights to use or enjoy all or any thereof either in the whole or in any part of the territory aforesaid; and for these purposes for me and in my name, if necessary, to make, sign, seal, stamp, acknowledge, verify, execute and deliver all deeds, contracts, covenants, instruments of sale, assignments or licenses, or other writing of any character which may be necessary or proper in the judgment of my said attorney, to accomplish any of the purposes of my agreement with Drexel Morgan & Company as set forth in said instrument of December 31st 1878, or any of the foregoing provisions of this power.

And I also empower my said attorney, if it shall be necessary or desirable for them so to do, in my name to agree with the purchasers of any of my inventions, discoveries, devices or letters patent thereof of the character

[PHOTOCOPY]

aforesaid, which shall be made by, or granted to me before
 January 1st 1884, or the grantee of any subdivision or
 other interest therein, or of other licenses or other rights
 to use or enjoy any of the same that such purchasers
 or grantees shall respectively have like title or interest
 or rights to those so acquired by them respectively in the
 inventions or patents of a date prior to January 1st 1884,
 in and to all further inventions which I may make and
 in and to all further patents which may be granted to me
 of the like character and for the countries aforesaid at any
 time between January 1st 1884, and the end of seventeen
 years from the 31st day of December, 1878, with power to my
 said attorney, the said Drexel, Morgan and Company,
 and the said firm as it may be hereafter constituted,
 and the legal surviving partners thereof, at any time during
 the operation of this instrument, to appoint other attorney
 or attorney in their place and stead, with the same powers
 and under the same conditions and restrictions herein pro-
 vided, and to revoke the powers of such substituted
 attorney or attorney at their pleasure.

Provided however that the price for such further inven-
 tions or patents made or granted after January 1st 1884 and
 before the end of seventeen years from December 31st 1878 shall
 be approved by me, or, if not approved by me, shall be fixed by
 the decision of two of three arbitrators, one to be appointed by
 me, one by the purchaser or licensee and the third by them;
 and upon such approval or fixing of a price therefor and
 upon such payment or securing thereof as my said attor-
 neys may determine on, I authorize and empower them to
 grant and accede to such purchasers or grantees aforesaid
 such further right, title and interest as aforesaid, and for

[PHOTOCOPY]

that purports to do all such things as are above enumerated
and all such other acts or things as may be necessary to be
done in the premises.

In Witness Whereof I have hereunto set my hand and
seal this first day of March one thousand eight hundred
and eighty one.

Sealed and delivered
in the presence of
Richard E. O'Brien
Richard E. O'Brien

Thomas Alva Edison

State of New York

City and County of New York

On this seventh day of
March A.D. 1881, before me personally came Thomas Alva
Edison, to me known and known to me to be the individual
described in and who executed the foregoing instrument, and
he then acknowledged to me that he executed the same and
for the uses and purposes therein mentioned.

In Witness Whereof I have hereunto set my hand
and affixed my notarial seal this seventh day of
March A.D. 1881.

Richard E. O'Brien

Notary Public, City of
(not filed with 4, 6.)

State of New York,
City and County of New York.

I, WILLIAM A. BUTLER, Clerk of the City and County of New York, and also Clerk of the
Supreme Court for the said City and County, the same being a Court of Record, DO HEREBY
CERTIFY, That

Richard E. O'Brien
has filed in the Clerk's Office of the County of New York a certified copy of his appointment as
Notary Public for the County of New York, with his autograph signature, and was
at the time of taking the proof or acknowledgment of the annexed instrument, duly authorized
and verily believe that the signature to the said certificate of proof or acknowledgment is genuine.
In testimony whereof, this said instrument is executed and acknowledged according to the
law of the State of New York.

In TESTIMONY WHEREOF, I have hereunto set my hand and affixed the Seal of the said
County and County, the
day of March 1881.

W. A. Butler
Clerk

[PHOTOCOPY]

Her Britannic Majesty's Consulate-General, New York.



I, EDWARD MONTIMER ARCHIBALD, Esq., COMPANION OF THE
MOST HONORABLE ORDER OF THE BATH, HER BRITANNIC MAJESTY'S CONSUL-
GENERAL, FOR THE STATES OF NEW YORK, NEW JERSEY, CONNECTICUT, RHODE ISLAND,
AND DELAWARE.

I do hereby Certify, That I have reason to believe that the Signature subscribed
and Seal affixed to the Certificate herewith annexed, are the true Signature and Seal of
Richard E. O'Brien who was, on the day of
the date of said Certificate, a Notary Public, in and for the State of NEW YORK,
duly commissioned and sworn, to whose Official acts faith and credit are due.

In Witness Whereof, I do herewith set my hand and seal of Office at
the CITY OF NEW YORK, this *ninth* —
day of *March* — In the year of our Lord, one

thousand eight hundred and ~~eighty~~ *eighty one*.


For the Embassy General,

Frederick A. A. A. A.
Consul.



1881. Electric Light - Foreign - United Kingdom (D-81-33)

[PHOTOCOPY]

Ex	2.	No. 2.
English.		
Covenants by Fathi and Lowrey, Trustees.		
Dated March 1 st 1881		
		
LATH & CO. Engineers, 123 Broadway, Fidelity Building, N.Y.		

[PHOTOCOPY]

Whereas in execution of terms of an instrument, dated December 31st 1878 made by and between Thomas A. Edison of the first part, Drexel Morgan & Company of the second part, and Egisto P. Fabbi and Grosvenor P. Lowrey as Trustees, of the third part, Edison has, by an instrument of even date herewith, transferred to said Trustees all his right, title and interest in certain inventions in said instrument described, which interest the said Trustees hold upon the trusts and conditions in said instrument and particularly in the second article thereof set forth.

Now for the purpose of executing the provisions of said agreement in respect to the inventions so held by them in trust, said Fabbi and Lowrey, as Trustees as aforesaid do hereby agree with Drexel Morgan and Company that they, the said Trustees, and the survivor of them, will from time to time, as the right, title, and interest of Edison in and to any of the inventions and patents which are the subject of Edison's agreement with them, as contained in said agreement of December 31st 1878, shall become vested in them by assignment or other transfer from Edison, assignor, transfer or grant to

[PHOTOCOPY]

such persons as may be appointed by Drexel, Morgan & Company either the whole right, title and interest in and to all or any of the inventions and patents assigned by Edison to them or undivided or other interests in all or any of them or licenses or other rights to use or enjoy any or all of them in and for the countries named in said agreement of December 31st 1878 as they may be requested to do by Drexel, Morgan & Company.

And said Fabbri & Lowrey agree further with Drexel Morgan & Company, upon their request, to execute the powers given to them by Edison by his power of even date herewith, in respect to such inventions covered by the agreement of December 31st 1878 as at any time may not have been specifically assigned to the said Trustees by making such grants, assignments, licenses or other rights to use or enjoy any of such inventions to such persons as may be appointed by Drexel Morgan & Company as they may from time to time request in virtue of and in conformity with provisions of the agreement of December 31st 1878 in that behalf provided.

And the said Fabbri and Lowrey Trustees, hereby authorize and empower Drexel Morgan & Company to sell and assign either the whole or

[PHOTOCOPY]

undivided interests in the inventions and patents which may from time to time be acquired by said Trustees from Edison in pursuance of the provisions of the agreement of December 31st 1878, or to grant licenses or other rights to use and enjoy all or any of such right, title and interest therein, as may at any time be vested in said Trustees under said agreement of December 31st 1878.

In Witness Whereof We have hereunto set our hands and seals this First — day of March — one thousand eight hundred and eighty one.

Sealed and delivered
in the presence of
Richard E. O'Brien

Egisto P. Fabbri
Grosvenor Porter Lacey

State of New York

City and County of New York

On this seventh day of March A.D. 1881, before me personally came Egisto P. Fabbri and Grosvenor Porter Lacey, to me known and known to me to be the individuals described in and who executed the foregoing instrument and they then severally acknowledged to me

[PHOTOCOPY]

that they executed the same and for the uses and purposes therein mentioned _____

In testimony whereof I have hereunto set my hand and affixed my notarial seal this seventh day of March A. D. 1881 _____

Richard E. O'Brien

Notary Public King Co.

(as filed w. R. J. C.)

State of New York,
City and County of New York.

I, **WILLIAM A. BUTLER**, Clerk of the City and County of New York, and also Clerk of the Supreme Court for the said City and County, the same being a **Copy of Record**, DO HEREBY CERTIFY, That

has filed in the Clerk's Office of the County of New York, a certified copy of his appointment as Notary Public for the County of _____ with his autograph signature, and was at the time of taking the proof or acknowledgment of the annexed instrument, duly authorized to take the same. And further that I am well acquainted with the hand writing of such Notary, and verily believe that the signature to the said certificate of proof or acknowledgment is genuine. I further certify, that said instrument is executed and acknowledged according to the law of the State of New York.

I, the FOREMOST WITNESS, I have hereunto set my hand and affixed the Seal of the said Court and County, the _____ day of _____ 1881.

Wm. A. Butler
Clerk

1881. Electric Light - Foreign - United Kingdom (D-81-33)

[PHOTOCOPY]

Her Britannic Majesty's Consulate-General, New York.



I, EDWARD MONTNER ARCHIBALD, Esq., COMPANION OF THE
MOST HONORABLE ORDER OF THE BATH, HER BRITANNIC MAJESTY'S CONSUL-
GENERAL, FOR THE STATES OF NEW YORK, NEW JERSEY, CONNECTICUT, RHODE ISLAND,
AND DELAWARE.

Do hereby Certify, That I have reason to believe that the Signature subscribed
and Seal affixed to the Certificate hereunto annexed, are the true Signature and Seal of
Richard. E. O'Brien who was, on the day of
the date of said Certificate, a Notary Public, in and for the State of NEW YORK,
duly commissioned and sworn, to whose Official acts faith and credit are due.

In Witness Whereof, I do hereunto set my hand and seal of Office at

the CITY OF NEW YORK, this *eightth* —
day of *March* — in the year of our Lord, one

thousand eight hundred and *eighty one*

for the Consulate-General,

Per my notary clerk,
Consul.



1881. Electric Light - Foreign - United Kingdom (D-81-33)

[PHOTOCOPY]

5/1	No. 3. English	
2	Trust to Egiote P. Falke and Governor P. Loring	
	Dated March 1 st 1881	
5/1	0.01	
	LITH & Co. Engineers, 125 Broadway, opposite Building, N. Y.	

[PHOTOCOPY]

Whereas by an instrument dated December 31st 1878 made by and between Thomas A. Edison of the first part, Drexel Morgan & Company of the second part and Egisto P. Fabbrì and Grosvenor P. Lowrey as Trustees of the third part, the said Edison agreed to assign all his right, title and interest in certain inventions to said parties of the third part upon the trusts in said agreement declared.

Now in execution of the provisions of said agreement and particularly of the second clause thereof, and for the consideration therein recited and in further consideration of One Dollar paid to me by the said Egisto P. Fabbrì and Grosvenor P. Lowrey before the sealing and delivery hereof, and the receipt of which is hereby acknowledged, I, the said Thomas A. Edison do hereby sell and assign to said Egisto P. Fabbrì and Grosvenor P. Lowrey all my right, title and interest in the following letters patent of the United Kingdom of Great Britain and Ireland namely: such letters patent issued to me dated October 23rd 1878 and Numbered 4226 for an improvement in the method of and means for developing electric currents and lighting by electricity; also such letters

[PHOTOCOPY]

patent issued to Edward Griffiths Bowen, as a communication from me, dated November 1st 1878 and numbered 4502, for improvement in lighting by electricity; also such letters patent issued to me dated December 28th 1878, and numbered 5206 for an improvement in the means for developing magnetism by electric currents and in illuminating apparatus for illuminating by electricity; also such provisional letters patent issued to me dated June 17th 1879 numbered 2402, for improvement in electric lights and in apparatus for developing electric currents and regulating the action of the same; and I also sell and assign to said Egisto P. Fabbrì and Grosvenor P. Lowrey all my right, title and interest to make, use and vend in the United Kingdom of Great Britain and Ireland, the Channel Islands and the Isle of Man, all my inventions, improvements and devices hitherto made in or relating to means for the development of electric currents and the application of the same to uses of illumination, power and heating, and all my right, title and interest in, to and under letters patent of the United Kingdom of Great Britain and Ireland for said inventions, improvements or devices, or any of them, upon the trusts, nevertheless, which are hereby assumed by said Egisto P. Fabbrì and Grosvenor P. Lowrey and

[PHOTOCOPY]

signified by their signature to this instrument,
First, to hold said letters patent and inventions
for the objects and purposes of the said agreement
of December 31st 1878, as therein set forth, in this
behalf, and from time to time by a suitable act
and deed to assign the same or any part thereof
or privilege thereunder, to such person or persons
and in such manner as may be directed or
appointed by Drexel, Morgan & Company; and in
case Drexel Morgan & Company shall have failed
to dispose of the principal or controlling inven-
tion referred to in the second clause of said
agreement of December 31st 1878 before the 1st day
of January 1886 then on the further trust, upon
demand in writing by me served on said Drexel,
Morgan & Company at any time within six
months after the expiration of such period, to
reconvey to me all said patents and inventions
so assigned to them, Subject however to such
subsisting licenses or partial or absolute as-
signments as may in the meantime have been
made in good faith under the direction or
appointment by Drexel, Morgan & Company,
but otherwise free and clear of all claims and
demands on the part of said Trustees, or any
persons claiming by, through or under them.

[PHOTOCOPY]

In Witness Whereof I have hereunto set
my hand and seal this First day of
March one thousand eight hundred and
eighty one.

12/2/20

Not. The words "the Channel Islands and the Isle of Man" being enclosed between the 16th & 17th lines of 2nd page, before entering.

Thomas A. Parsons

Witness

L. B. Colver

Richard E. O'Brien

State of New York

City and County of New York

City and County of New York ss. On this seventh day of March A.D. 1891, before me personally came Thomas Alva Edison, to me known and known to me to be the individual detailed in and who executed the foregoing instrument, and he then acknowledged to me that he executed the same and for the uses and purposes therein mentioned.

In testimony whereof I have hereunto set my hand and
affixed my notarial seal this fourth day of March
A.D. 1881

Richard E. O'Brien

Notary Public Kings Co.
(Cons. filed in N. Y. Co.)

State of New York, }
City and County of New York. }

I, **WILLIAM A. BUTLER**, Clerk of the City and County of New York, and also Clerk of the Supreme Court for the said City and County, the same being a Court of Record, DO HEREBY CERTIFY That

was filed in the Clerk's Office of the County of New York, a certified copy of his appointment as Notary Public for the County of New York, with his autograph signature, and was at the time of taking the proof or acknowledgment of the annexed instrument, duly authorized to take the same. And further that I am well acquainted with the hand writing of such Notary and verily believe that the signature to the said certificate of proof or acknowledgment is genuine. I further certify that said instrument is executed and acknowledged according to the law of the State of New York.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the Seal of the said Court and County, the 8 day of March 188-

188-
N. Britton

[PHOTOCOPY]

Her Britannic Majesty's Consulate-General, New York.



I, EDWARD MORTIMER ARCHIBALD, Esq., COMPANION OF THE
MOST HONORABLE ORDER OF THE BATH, HER BRITANNIC MAJESTY'S CONSUL
GENERAL, FOR THE STATES OF NEW YORK, NEW JERSEY, CONNECTICUT, RHODE ISLAND,
AND DELAWARE.

I do hereby Certify, That I have reason to believe that the Signature subscribed
and Seal affixed to the Certificate herewith annexed, are the true Signature and Seal of
Richard E. O'Brien who was, on the day of
the date of said Certificate, a Notary Public, in and for the State of NEW YORK,
duly commissioned and sworn, to whose Official acts faith and credit are due.

In Witness Whereof, I do herewith set my hand and seal of Office at

the CITY OF NEW YORK, this *eightth*

day of *March*. In the year of our Lord, one

thousand eight hundred and *eighty one*.

In the Consulate-General.

James M. McDermott,
Consul.

1881. Electric Light - Foreign - United Kingdom (D-81-33)

[PHOTOCOPY]

Thomas A. Edison
- to -
Egisto P. Fabbri and
Governor P. Leung

Power of Attorney
(England)

Dated March 1st 1881.

[PHOTOCOPY]

Whereas, in execution of provisions of the third article of an Agreement dated Twelfth 31st 1878, made by and between Thomas A. Edison, of the first part, Duval, Morgan & Company, of the second part, and Egisto P. Falchi and Governor P. Lowry, Trustees, of the third part, the said Edison has assigned and has agreed to assign hereafter to said Falchi and Lowry, as Trustees, certain inventions and improvements of the character described in said Agreement of December 31st 1878.

And whereas it is provided by said third article that in respect to any inventions, improvements and devices or letters patent of the character aforesaid, which at any time shall not have been assigned by said Edison to said Trustees the said Edison shall give to them a power of the tenor and for the purpose in said article set forth.

Now, in execution of said provision, I, the said Thomas A. Edison, have made, constituted and appointed, and do hereby make, constitute and appoint the said Egisto P. Falchi and Governor P. Lowry and the survivor of them, my true and lawful attorneys and attorneys vicariously for me and in my name, place and stead, to sell, assign and transfer to such persons as may be appointed by Duval, Morgan & Company, being such persons as shall therefore have become purchasers of any of the inventions, improvements, devices and letters patent contemplated by said third article of that agreement, all my right, title and interest in and to all inventions, improvements, devices and letters patent of Great Britain and Ireland thereof of the character described in said agreement which at any time before the 31st day of Janu-

[PHOTOCOPY]

any, 1884 may have been made by me and which shall not then have been specifically assigned to said Father and Sonny, and also to grant, assign and transfer undivided or other interests or rights of any description in or under such inventions, improvements, devices or letters patent aforesaid, and for me, and in my name, to grant to such person or persons by Devel, Morgan & Company licenses or other rights to use and enjoy all or any of the then unassigned inventions, improvements, devices or letters patent, either in the whole territory covered by said agreement of December 31st 1878, or in any portion or places thereof, and upon any such sale, grant, assignment or transfer as aforesaid, to make, transfer, assign, sell, stamp, execute, verify, and deliver, in my name, and as my act and deed, all agreements, covenants, instruments of sale, assignments, licenses or other agreements or instruments in writing of every nature which may be necessary or proper in the judgment of my said attorneys or the survivor of them to effectuate any such disposition as aforesaid of all or any of my said unassigned inventions, improvements, devices or letters patent according to the appointment and direction of said Devel, Morgan & Company, with power to my said attorneys and the survivor of them to substitute other attorneys or attorney in their and his place hereunder and to revoke the powers of such substitutes in their discretion. — Provided only that, as stipulated by said third article of the Agreement of December 31st 1878, any such sale, license or other grant of interest as aforesaid to be made by my said attorneys or attorney, by either himself, to such appointee of Devel, Morgan & Co., shall be limited to such and no greater estate, interest or right of use than

[PHOTOCOPY]

that then owned by such appointees in the inventions, im-
provements, devices or letters patent aforesaid originally
purchased by them.

In Witness whereof I have hereunto set my hand
and seal, this first day of March one thousand eight
hundred and eighty one

Sealed and delivered
in the presence of

Richard E. O'Brien

Thomas Alva Edison

State of New York

City and County of New York

On this fifth day of
March A. D. 1881, before me personally came Thomas
Alva Edison, to me known and known to me to be the
individual described in and who executed the fore-
going instrument, and he then acknowledged to me
that he executed the same and for the uses and
purposes therein mentioned.

In testimony whereof I have hereunto set my
hand and affixed my notarial seal, this fifth
day of March A. D. 1881

Richard E. O'Brien

Notary Public, N.Y.C.

(not filed in N.Y.C.)

State of New York,
City and County of New York.

I, WILLIAM A. BUTLER, Clerk of the City and County of New York, and also Clerk of the
N. Y. Supreme Court for the said City and County, do hereby certify, that

has filed in the Clerk's Office of the County of New York, a certified copy of his appointment as
Notary Public for the County of New York, with his autograph signature, and was
sworn to before me, and acknowledged the same, and further that I am well acquainted with the hand-writing of such Notary,
and verify that the signature to the said certificate of appointment is genuine. I further certify, that said instrument is executed and acknowledged according to the
law of the State of New York.

In Testimony Whereof, I have hereunto set my hand and affixed the seal of the said
City and County, the

day of March 1881
W. A. Butler

[PHOTOCOPY]

Her Britannic Majesty's Consulate-General, New York.



I, EDWARD MOITNER ARCHIBALD, Esq., COMPANION OF THE
MOST HONORABLE ORDER OF THE BATH, HER BRITANNIC MAJESTY'S CONSUL-
GENERAL, FOR THE STATES OF NEW YORK, NEW JERSEY, CONNECTICUT, RHODE ISLAND,
AND DELAWARE.

Do hereby Certify, That I have reason to believe that the Signature subscribed
and Seal affixed to the Certificate herewith annexed, are the true Signature and Seal of
Richard. E. O'Brien who was, on the day of
the date of said Certificate, a Notary Public, in and for the State of NEW YORK,
duly commissioned and sworn, to whose Official acts faith and credit are due.

In Witness Whereof, I do herewith set my hand and seal of Office at

the CITY OF NEW YORK, this *eightth* —

day of *March* — In the year of our Lord, one

thousand eight hundred and ~~eighty~~ *eighty one*

for the Consulate-General,

Edward Moitner Archibald,

Consul.



[PHOTOCOPY]

101-



Know all Men by these Presents, that whereas by an agreement made between Thomas Alva Edison of the first part, Dr. J. P. Morgan & Company of the second part, Augustus Paolo Fabre and Prosperus Porter Lowry of the third part, and the Right Honorable Edmund Russell Downing and others subscribers to said agreement of the fourth part, and the said Thomas Alva Edison have agreed to sell and assign to the Company to be formed in pursuance of said agreement and the now provided to be called The Edison Electric Light Company, Limited and hereinafter described as the Company the several letters patent specifying in the schedule to said agreement to which for certainty reference is hereby made. And whereas certain of said letters patent have been taken in the names of Edw. Jensen or of Edward Griffith Brewer but on my behalf and for my benefit. Now for the purpose of executing said agreement in the respect aforesaid, the said Thomas Alva Edison do hereby authorize, empower and direct the said Alfred Jensen and Edward Griffith Brewer to assign, convey and transfer to said Company all of the letters patent aforesaid which stand in their names respectively and on my behalf to make sign, seal, stamps, acknowledge, duly execute and deliver to said Company all such instruments of sale, conveyance, assignment or otherwise as may be necessary to vest in said Company all the right title and interest which either of or the said Jensen or Brewer have in any of said letters patent taken in the names of either of them. In witness whereof I have hereunto set my hand and seal this twenty-first day of February in the year one thousand eight hundred and eighty-two.

Signed, sealed and delivered in the presence of

Paul Jessell

Charles Holt

Thomas Alva Edison



United States of America

State of New York

City and County of New York

On the 17th day of February in the year one thousand eight hundred and eighty-two before me personally came Thomas Alva Edison to me personally known and known to be the individual described in and who executed the foregoing instrument and acknowledged to me that he executed the same. Tested (s)

Notary Public
1882



[PHOTOCOPY]

[FILMED IN SECTIONS]

1

2

Part One

No. of Sheet	Date
523	October 23, 1877
524	October 23
525	October 24, 1877
526	"
527	October 25
528	"
529	October 26, 1877
530	February 16
531	February 19
532	April 5

No. of Sheet	Date
4282	November 7, 1877
3165	September 1, 1877
3171	February 1, 1877
318	January 25
3165	March 3
3200	March 31
3783	April 25
3788	May 3
3793	May 9

The exhibits above referred to

Part Two

No. of Sheet	Date
2898	March 7, 1877
2898	June 3
3231	July 23
3683	March 16
4774	October 10
4776	October 11

Part Three

No. of Sheet	Date	No. of Sheet	Date
3794	September 16, 1877	3794	September 1, 1877
3798	September 25	3823	September 1
3849	September 26	3859	September 19
3851	October 27	3852	October 11
3853	February 9, 1878	3853	October 12
3792	February 28		
3823	March 22		
3853	March 2		
3859	July 6		

John Edgerton, witness, declared before the Court
 "I am not a party to this document."

Witness, declared and delivered in the presence of

Charles A. Smith
 J. A. Smith

Thomas Alva Edison

Anthony Joseph Rinaldi
 Francis Anthony Rinaldi

Epist. Paolo Fabbri
 James H. Wright
 James H. Wright
 Epist. Paolo Fabbri
 James H. Wright

J. A. L.

G. A. B.

A. J.

A. T. D.

T. A. O.

J. R. M.

G. H. E.

J. H. H.

G. H. E.

G. H. E.

G. A. B.

May 24/84

Thomas A. Edison Esq.

My dear Sir,

My son
has lately been apprehensive with
something akin to child's fear,
but ambitious to be always on
hand at your laboratory. He
will not lay off for which
reason, as he spends this
holiday at home in Beverly
Hill, I have instructed him
to remain one till Sunday,
feeling assured he will thereby
be all the better qualified to
perform his duties on his

1884. Edison, T. A. - Employment (D-84-13)

return & hope you will not
deem my action unwarrantable
or find it an inconvenience to
you

Very respectfully,
Philip Van Cester

142 West 15th St

New York 30 May 1884

acknowledged
recd of bookkeeper of
Conover & West 15th Street
New York Volume 1884

Thomas A. Edison Esq

My dear Sir,

I regret to inform you that my son has gone home to Beverly very ill. Being deeply interested in the work at your laboratory he was quite unwilling to give up but he ought really to have done so weeks ago and reports from Beverly indicate that if a severe illness can now be averted we shall have good reason to be thankful.

I took the liberty of sending you yesterday a sample case of "Kodak" a camera peculiarly adapted to brain workers. Thos phosphor Keir Goddard & will be found very refreshing this hot weather particularly if drank cold, but not with ice in it.

Anticipating to send favorable report of my son in a few days I am very respectfully

Yours faithfully
Edison

[1885]

Dodd Mead & Co

Forster's Mother 2.00
 Niebuhr's Greek Heroes 1.00

Gregg's Calligraphy 150
 Matthews - getting on the wires 150
 " great Conversations 2.00
 " Words - 2.00
 " Monday Chats 2.00
 " Orators 1.50
 Literary Style 1.75

Morris - British Thought 1.00
 Robertson's dining table 1.00
 Victor Hugo by Burton 1.00
 Viking Tales by Anderson 2.00



25 GRAMERCY PARK.

appleton.

Alison's Essays 2.00
 Bagshot Physicist 1.50
 Beecher's HW - 12 lectures to young men 1.50
 Julius Bernstein's Senses 1.75
 J. L. Bloomer Cryptography 5.00
 W. S. Carpenter's Principles of Mental Physiology 3.00
 Julius Chambers' Mindworld 1.25
 J. P. Cooke's Scientific Culture 1.00
 Dr. J. H. Corns' Brain 2.00
 Cousin's philosophy 4.00
 4 lectures 2.00
 Fensler by Dr. Hawkesworth 2.00

[1885]

Figuiers - Birds & Reptiles	4.00
Ocean waves	1.50
Vegetable world -	1.50
World before Deluge -	1.50
Galton, Englishmen & France	1.00
Garnier - Billiards	3.50
Gaskell's Life of B. Browne	1.50
g. Gaskie. Yucca	2.50
Gosse's Microscope	1.50
St. Wm. Hamilton & Co. Albany	2.00
Geo Harris Central Am. & Asia	1.50
Sw. & G. W. Herschel Astronomy	4.00
John S. Hittell, Culture	1.50
St. Wm. Halland Recollections	2.00
Jos. C. Howe, Zoroaster's Lives	2.50
	1.00

Webster Unabridged	
WS Jervons & Mearns	176-
Lubbock - San John	} - 300
Pices ante etc	
Vallais works	
H Moraselli - Suicide	175-
L Pasteur - Life	150
G Marum Sims Life -	150
William Chemistry of Poetry	150
<hr/>	
Arresting Catalogue	
Life Charles Lyell North	150
Josephs books	3.75-
Ringslake Esthen	1.00
Hydrology Whistler	1.25-
Sydney Smith by Hubbard	175-

1886. Telegraph (D-86-39)

[FROM ALFRED O. TATE (INCOMPLETE)]



New Hotel Lafayette

L. O. MALTBY

Philadelphia May 7/ 1886

Paul Roscut Esq

New York

Dear Sir:

I recd your telegram and aird
you in response to see Mr. Mavor at
63 Broadway whom you could access.

I stated quad wire with phone
connections to New York tonight and
I think we can work it.

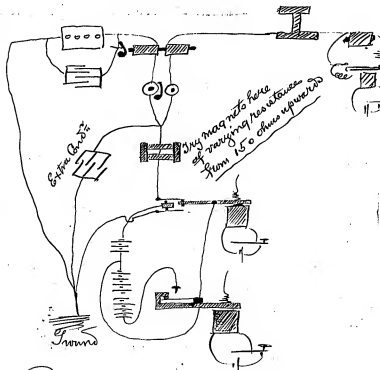
I want to test again tomorrow
and to try connections as per
diagrams following. Please go to

1886. Telegraph (D-86-39)

[FROM ALFRED O. TATE (INCOMPLETE)]

main office and connect like this:-

No 1



Enquire of Mr. Gardiner
if his quad is furnished
at board or direct &
if we try phone with

1891. Edison, T. A. - General (D-91-02)



Essen, 6th April 1891.

Ans. 30th June 1891

My dear Mr. Edison,

Ever since J have received your grand present, J have turned about in my mind, how J could embody the mark of attention which J was longing to put before you so as connect it in some way or other with the line of business which J pursue. J could not send you a gun for your own private use. At last J have conceived the idea to put together an arrangement of writing table implements out of models of guns and projectiles.

Although the work has finally not turned out as tasteful as J wished it to be, J may say that it was conceived with the best intention and in handing it to you J beg to assure you that its accomplishment has been followed by me with a most keen and hearty interest.

You may like to know that J have presented a duplicate to His Majesty the German Emperor and that said duplicate is the only specimen in existence besides yours.

J sincerely beg to request you to kindly receive the small gift as a mark of my great esteem; should you ever make

1891. Edison, T. A. - General (D-91-02)



use of it I would be very pleased indeed.

Believe me, my Dear Sir,

Yours most faithfully

Thomas A. Edison

My dear Sir,
I have the honor to acknowledge the receipt of your letter of the 10th inst. in relation to the use of the Edison system of electric lighting in the city of New York. I am very pleased to hear that you are so interested in the subject, and I am sure that you will find the Edison system of electric lighting to be the most efficient and economical system yet devised. I have the honor to enclose herewith a copy of the report of the Edison Electric Company, which will give you a full and complete description of the system, and of the results of its use in the city of New York. I am sure that you will find this report to be of great interest and value. I am, Sir, very respectfully,
Yours most faithfully,
Thomas A. Edison

1891. Glenmont (D-91-33)

PROGRAMME

—OF—

MATINÉE MUSICALE,

AT THE RESIDENCE OF

Mrs. Thomas A. Edison

"GLENMONT," LLEWELLYN PARK,

ORANGE, N. J.

Saturday, May 16, 1891, at four o'clock.

(Through the courtesy of Mr. FRANKLIN SONNEKALB.)

UNDER THE AUSPICES OF

*Hakuai Circle of The King's Daughters of
Calvary Methodist Episcopal Church.*

BENEFIT FRESH AIR FUND AND FLOWER MISSION.

1891. Glenmont (D-91-33)

The following Artists will assist:

Miss LILLIE P. BERG, SOPRANO,

Miss FLORENCE MEIGS, CONTRALTO,

Miss AGNES STEWART, CONTRALTO.

Mr. FRANKLIN SONNEKALB, PIANIST.

And also the following Singers, (Professional and Amateur).

SELECTED FROM MISS BERG'S VOCAL CLASS.

Miss MINNIE AITKEN.	Miss FLORENCE MEIGS.
Miss MARY ANGELL.	Miss BIRDIE O'NEILL.
Miss ALICE DYCKMAN.	Miss MINNIE O'NEILL.
Miss LILLIE E. PERRY.	Miss MINNIE C. QUINN.
Miss MINNIE FRIEDMAN.	Miss HARRIET C. PALMER.
Miss CARRIE FOX.	Miss SELMA ROTUNDRIN.
Miss LILLIAN M. HATCH.	Miss ROBERT S. SIMMONS.
Miss EDITH LAUTERBACH.	Miss KITTIE STEBBINS.
Miss EDWARD LAUTERBACH.	Miss AGNES STEWART.
Miss CLARICE LUDLAM.	Miss MARY VAN BUREN.
Miss ANNIE MEYER.	Miss ALICE E. WEIL.
	Miss LEONORE WOODWARD.

Miss ALICE BLAKE, Accompanist.

Programme.

1. a. ETUDE No. 1. Op. 25. (Aeolian Harp) *Chopin*
b. ANACREON. "To his Lyre" *Seneca*
Mr. FRANKLIN SONNEKALB.
2. DUET. "Nothing" *DeWitt*
New (Dedicated to Miss Berg.)
Miss LILLIE P. BERG. Miss FLORENCE MEIGS.
3. a. "Comment disaient-ils?" *Liszt*
Comment, disaient-ils, avec nos merveilles, fair les aquanals? Rumer, rumer, disaient-ils.
Comment, disaient-ils, outiller garçons, mères, et pères? De rumer, d'outiller, disaient-ils.
Comment, disaient-ils, enchanter les belles sans-piedres caillies. Alors, alors, disaient-ils.
Rumer, rumer, alors, disaient-ils, disaient-ils?
b. "Twain April." *Verdi*
Twain April, Twain Sunday: the day was fair,
Yes! sunny and fair,
And how happy was I!
You wore the white dress you had to wear;
And two little flowers were hid in your hair,
Yes! in your hair,
On that day, come to,
We sat on the moss, it was shady and dry,
Yes! shady and dry;
We sat in the shadow,
We looked at the leaves,
We looked at the sky,
We looked at the brook which bubbled near by,
Yes! bubbled near by,
Thro' the quiet meadow,
A bird sang on the swinging pine,
Yes! on the pine,
And then sang out:
Look, your little white hand in mine;
Twain April, Twain Sunday: Twain warm sunshine
Yes warm sunshine,
Have you forgot?

- Miss LILLIE P. BERG.
1. FANTASIE ESPAGNOLE, (first time) *Seneca*
Dedicated Madame de Bayreuth.
Mr. FRANKLIN SONNEKALB.

PROGRAMME CONTINUED ON 4th PAGE

Programme.

The Cantata, KING RENÉ'S DAUGHTER. Smart.

Conducted by Miss Lillie Berg.

KING RENÉ'S DAUGHTER.

ARGUMENT.

Isabelle—daughter of King René, Count of Provence—has been betrothed in infancy to the son of the Count of Vandamont. Stricken with blindness when but a year old, she has been reared with all knowledge of the faculty of sight withheld from her. A leech or magician has promised to restore her sight by means of an amulet he has given her, on condition that she is first informed of the nature of her blindness; but the king has refused permission.

Isabelle's betrothed, wandering on a trout-stream, lights upon her alone in a valley of Vandamont. With out knowing her—far too fearful to have kept their lives apart—the truant knight is entangled by her leechy. He does not know that she is blind, and his words reveal to her the faculty of which she has been kept in ignorance: he then unwittingly aids the magician's art, and Isabelle is restored to sight.

This story is freely adapted from Henrik Ibsen's drama.

No. 1. CHORUS.

No. 2. TRIO AND CHORUS. MISS SARAH ROBINSON, MISS ALICE WEBB, MISS JAMES STEWART.

No. 3. DUET AND CHORUS. MR. LEAHY GRACE, MISS JAMES STEWART.

No. 4. DUET AND ARIETTA. MISS FLORENCE MEES.

No. 5. QUARTET. THE MESS. PALMETTO, QUIN, WEBB, STEWART.

No. 6. SOLO AND CHORUS. MISS SARAH ROBINSON, MISS ALICE WEBB.

No. 7. DUET AND ARIA. MISS LILLIAN M. GRACE.

No. 8. DUET. MISS SARAH ROBINSON, MISS JAMES STEWART.

No. 9. TRIO. 'MRS. ROBERT SHERMAN, MISS CHARLOTTE LEBLANC, MISS JAMES STEWART.

No. 10. DUET AND CHORUS. MISS AMIE MEYER, MISS JAMES STEWART.

No. 11. DUET AND CHORUS. MISS ALICE WEBB, MISS JAMES STEWART.

No. 12. FINALE—Soprano, Solo and Chorus. MRS. ROBERT SHERMAN.

No. 1.—OVERTURE.

No. 2.—CHORUS.—*Valley of the Spring*

Valley of summer flowers!
Valley of golden grain!
Valley of vineyard bowers—
How sweet to such home to remain!

Here the first smile of spring is the sweetest.
Here the rose day of summer is long.
Here the glad autumn vine is held sweetest
With golden fruit's cluster and song.

Here the garlands of spring first are showing.
Here her brightest the summer time weaves.
Here the year has of summer's day long.
A grape jeweled crown of even shows.

Valley of summer flowers!
Valley of golden grain!
Valley of vineyard bowers—
How sweet to such home to remain!

No. 3.—TRIO (*Soprano, Alto, Tenor, and Contralto*) AND CHORUS.—*Valley of the Spring*

See how gay the valley abides
In the early morning hours—
With the soft of tender vines
And the silver dove leaves!

There—ah! fairer than the spring—
Dwells the daughter of a king.
Blind from infancy, she knows
Not to touch along the row.

But, ah! by touch alone,
Sight to her is all unknown!

Will they say it one hour's part's
It will give the precious dove's
If but first to and the spell.
One her love to her early tell.
Less that her has long known of it.
Now to her love to be revealed!

Heaven up the glow way
Where her love's gentle party song.
Ever restless in their lay
Of the daughter of the king.

No. 1.—HECITT.—*Mezzo-Soprano and Contralto*
AND CHORUS.*Maria.*

There is a fair maid dwelling there,
In position to sing choirs,
Like musical fruits her golden hair
To the diamonds of her waist!

Beatrice.

Aming the garden bloom she grows
As bright as spring's first ray,
That waxes the blood as it flushes rose
And green leaves on the spray.

Dick.

To her low there comes a lady,
And a soft voice sweetly singing,
And the nightingale grows wate,
While the voice and chord are ringing.

Chorus.

And the nightingale gives note
While the voice and chord are ringing.

Maria.

There is a fair maid dwelling there
Who sings, gentle and true,
No note out of her golden hair
Nor the diamonds at her waist!

Beatrice.

But often at her easement pass
She waits the nightingale's song,
And voice and lute are heard again
In the glow her hair is ringing.

Dick.

To her low there comes a lady,
And a soft voice sweetly singing,
And the nightingale grows wate,
While the voice and chord are ringing.

Chorus.

And the nightingale grows wate
While the voice and chord are ringing.

No. 2.—HECITT.—*Mezzo-Soprano.**Maria.*

From her low
Harkens my lady fair,
With footsteps at the doorway hour
Filling the night air!

The nightingale!

ARRETA.

Lying to the nightingale,
Comes my lady fair,
While the glowing twilight pale,
Lies the star-beams there!
All the while are sweetly ringing,
Is it joy or pain?

Midst the while are ringing
Tri-singing, again!
Come the star-beams there,
Comes my lady fair,
Lies to the nightingale,
Comes my lady fair.

Lying to the nightingale
Waiting my lady fair,
Till her out a face full hail,
On the terrace deck,
All the while are sweetly ringing—
Joy or pain the tone?
As her hand by her the singing,
Joy to joy mine!

Come the star-beams there,
Comes my lady fair,
Lies to the nightingale,
Comes my lady fair!

No. 4.—QUARTET.—*Two Soprano and Two Contralto.**Solo Soprano.*

Who hath seen the troubadour?
Who hath heard his song?

The singers.

We have seen the troubadour,
The pensive walks among,
On a lonely he flung his sword,
While his lute he sung.

We could hear the sound and word
On the still night sound.
Solo Soprano.
"Take, oh! take me now"—he said—
"I'll be his own,
Faintly white or ring red!"

Quartet.

"Answer made she none,
For he wrote his lute upon her
Took she none more,
Happy to that troubadour,
Singing out in vain.

No. 7.—SUSAN AND CHORUS.

Maria.

The spell was wrought—for now she knows
What we have dared not disclose.

Chorus.

Who knows the gift of sight, she knows
What they have dared not to disclose.

Maria, Beatrice and Chorus.

Oh! happy chance, that mine may be
Should be the enchanter's power to-day.

Beatrice.

Come, let us go—

Maria.

Hark! where she sings below—

Dick.

A passion through her singing steals,
That cannot now be revealed.

Maria, Beatrice, and Chorus.

You-to the enchanter's spell has wrought the magic
You-to the sight—to sight, that precious dawn.

No. 8.—HECITT.—*Soprano.**Beatrice.*

"White or not?"
"Which would I choose?"—he said.

Here with his lute,
Each silent soul listens
The sweetest of a sweet performance—
"I know it is a rose."

All.

I have the rose just with the summer dew—
Fresh with the dawn it slept upon the spray,
And there each seen the pale no light wing flew
Around the breeze to steal some secret away.
It were a wonder's hand to take that rose,
With all its wealth I told the chosen mine—
Sweet love, what chance those silent bloom
Sings—

I love the rose—because the gift is thine;
I'll love the rose when all its beauty's past,
And when the fresh folds withering fall away,
For then—condemned it is sweeter to the last
Sleeps that fall joy of someone's perfect day;
Sleep the full joy of many happy hours
That still he need leaves seen to can divine,
Thence in my heart—the gift of all the flower—
I'll love the rose because the gift was thine.

No. 10.—HECITT.—*Maria (Mezzo-Soprano)*

What magic in a moment's song must dwell,
That might can thus reduce,
Say, of the minstrel knight, what do they tell,
What form, what look he wore?

Beatrice (Contralto).

A gentle knight, they say, in form and face,
As e'er was found in real or fancy's view,
A jewel! hardly did his shoulder grace,
Beating the blue and green,
The helms on his breast had half conceal'd
A bright star shining in an azure field.

Maria.

She in an azure field—ah! it were he,
The long-lost knight! now, in passing well,
The gift is thine by his great name should he,
His song should still the spell!

No. 11.—TRIO.—*Beatrice (Contralto).*

New amidst and spell
Have wrought the magic power,
Ah, me—what words can tell
The nature of the hour?

Isabella (Soprano).

She when she comes—her smile
Seems as to light her way;
See her the hour is told
For loveliness to stay.

Isabella (Soprano).

With welcome glad and sweet
Seems as to light her way;
With joy my heart to greet,
No heart of mine can tell
Like those were want to give,
The dream of happy hours,
It seems to sight as though
My thoughts were late to fly to hers.

Isabella, Maria, and Beatrice.

Before I say I gave what region brings
I know the hour is told
She knew not even in I say I dream,
The flower's I say I love'd how fair they shone—
I say I love'd how fair they shone—
What joy to I think!

New amidst and spell
Have wrought the magic power,
Ah, me what words can tell
The nature of the hour?
Oh! silent charm, still dwell
In every song and flower.

1891. Glenmont (D-91-33)

To a new life awakes—
 There,
 A new-found path to bring—
 Ah! fair as driving breezes
 To gladden the world by spring;
 When all the shades that fell
 With night up from and low'r,
 Morn's golden beams dispel,
 With smile of milder power,
 Ah! no—what words can tell
 The rapture of the heart!

No. 11.—DUET AND CHORUS.—*Maria*

Supra and Contralto.

Maria and Beatrice.

Sweet the "Angela" is ringing,
 O'er the river, up the dell;
 Peace and rest to labour bringing,
 Chimes the bell—chimes the bell.

Maria.

All the vineyard hives are still,
 O'er the mountain side,
 Dreams the shadow on the hill,
 Dreams upon the tide.

Beatrice.

Village lights with cheery beam
 Through the twilight come—
 Dropping down the flowing stream
 Glides the fisher home.

Maria, Beatrice and Chorus.

Sweet the "Angela" is ringing,
 O'er the river, up the dell;
 Peace and rest to labour bringing,
 Chimes the bell—chimes the bell.

Maria.

Silent sleeps the harvest plain
 When the reapers' cry
 Hoes and fell—again, again—
 Through the long, bright day.

Beatrice.

In the cloud land o'er the shade
 See the faint moon lies,
 Like a shining sickle blade
 Re-sing, in the skies.

Maria, Beatrice, and Chorus.

Sweet the "Angela" is ringing,
 O'er the river, up the dell;
 Peace and rest to labour bringing,
 Chimes the bell—chimes the bell.

12.—REACT.—*Maria Supra.*

Maria.

Oh what a dawn to-morrow's dawn will be!
 Haste, the glad new into the king to tell.
 Joy to his daughter—come ye to thy,
 The knight betroth'd, whose voice awoke the
 spell.

WITH CHORUS.

Fair fall the day, oh! speedy come the day,
 For a bridegroom and for a bride lay.

13.—FINALE.

Maria, Beatrice and Chorus.

Now, the king, will ride forth from the gate
 With his horsemen and banners in state,
 And the trumpets shall fanfare ring
 To Rome, to Rome, the king!

Beatrice (Supra).

Then call for my chapel one flow'r,
 The fairest the bloom valley knows,
 For love that of song is the dew'r
 May enshrine its joy in a rose.

CHORUS.

Now, the king, will ride forth from the gate
 With his horsemen and banners in state,
 And the trumpets shall fanfare ring
 To Rome, to Rome, the king!
 Then with roses, and lilies, and with dews
 The bride in her beauty will come—
 And the light of her eyes, they will say, has sur-
 passed
 The diamonds that shine at her waist—
 The diamonds that glaze in her long golden hair—

Beatrice.

Then call for my chapel one flow'r,
 The fairest the bloom valley knows
 For love, that of song is the dew'r
 May enshrine its joy in a rose.

CHORUS.

Now shall the trumpets their fanfare ring
 To the peerless fair daughter of Rome the king!

1892. Electric Light - Foreign (D-92-26)

[PHOTOCOPY]

EATON & LEWIS

S. S. EATON
EUGENE H. LEWIS

Law Offices

44 Broad Street (EDISON BUILDING)

New York, July 12, 1892

Thomas A. Edison Esq.,
Orange, N. J.

RECEIVED

JUL 13 1892

Dear Sir:

Ans'd July 15 - 1892
ack'd Aug. 22/92

You will probably remember that last Summer and Fall there was considerable correspondence and work done in connection with some assignments by you to the Brush Electrical Engineering Co. as to your patents in Australia, New Zealand, India, Ceylon and South Africa. Your original agreement with the Edison's Indian and Colonial Company provided that you should be entitled to a free and exclusive license under all the patents for purposes of locomotion on railways, tramways and common roads, such license to be at your own cost.

You will remember also that in 1889 the Indian and Colonial Co. was succeeded by the Australasian Electric Light, Power & Storage Co. and later by the Brush Electrical Engineering Co. The assignments of your patents to the Brush Co. were sent to you for execution and you submitted them to me to investigate the matter. After thorough investigation, I advised you that you could execute the assignments, and that you were entitled to the free and exclusive licenses in the various countries for locomotion purposes.

1892. Electric Light - Foreign (D-92-26)

[PHOTOCOPY]

as provided for in your agreement with the Colonial Co. I prepared a form of such license, which was approved by you and afterwards executed by the Brush Co. All this, however, had to be done through Messrs. Waterhouse, Winterbotham & Harrison, of London, and they now send their bill to me for their services and disbursements as well as for an amount paid by them to the Solicitors of the Brush Co., Messrs. Renshaw, Kekewich & Co., for their services in regard to the completion of the license from the Brush Co. These two bills amount altogether to £47. 18. 6, for which I desire to send a Bill of Exchange to Messrs. Waterhouse, Winterbotham & Harrison.

Will you please therefore send me a draft or Bill of Exchange for this amount, to the order of that firm, payable in London, and I will write to them therewith, if agreeable.

Very truly yours,



E.
H.

1892. Electric Light - Foreign (D-92-26)

[ENCLOSURE (PHOTOCOPY)]

Brush Electric Engineering Co. to Edison

Received of Messrs Watson & Co. Warrington
& Harrison the sum of Twenty seven pounds three
shillings and sixpence costs of Letter to Mr.
Edison

£27. 3. 6.

Received of Messrs Watson & Co. Warrington
& Harrison the sum of Twenty seven pounds three
shillings and sixpence costs of Letter to Mr.
Edison

RECEIVED COPY 1

2/2/92

1892. Electric Light - Foreign (D-92-26)

[ENCLOSURE (PHOTOCOPY)]

February 1892

V A Edison & Co.

1618
D. to
Waterhouse, Winterbotham
& Harrison

Professional charges in relation
to license in respect of
Edison.

[ENCLOSURE (PHOTOCOPY)]

1, New Court, Carey Street
 Lincoln's Inn,
 London, W.C.

February 1892

V. A. Edison Esq.

Dr. to Waterhouse, Winterbotham & Harrison.

To Professional charges in relation to the
 preparation and completion of a free and
 genuine license in respect of the Patents
 and letters of registration in reference
 whereto you recently expressed separate
 assignments for the Colonies of Tasmania,
 Victoria, Western Australia, South Australia,
 Queensland, New South Wales, & New Zealand
 and the Cape of Good Hope India & Natal
 Attendance Correspondence &c May 1891
 to January 1892

20

To costs out of pocket viz.

Fees paid to Counsel

Stamps

Travelling Expenses, Carriage &c.

Postages & Telegrams

Registration & other fees

Other expenses, viz.

10

5

5

£ 20 15

Particulars if desired

[PHOTOCOPY]

(3) Under date of October 2nd, 1891, I wrote a letter to Mr. Tate on this general matter, from which I quote as follows:

" I am told that Messrs. Drexel, Morgan & Company have never paid any of Mr. Edison's expenses touching experiments and patents for these inventions. Consequently, there is some reason to hold that they have lost their rights, and that Mr. Edison can pretty safely go ahead and act on the hypothesis that he alone owns Australia. As a lawyer, I cannot say that he may safely do this; but he, as a business man, may conclude to do it and take his chances",

(4) It would appear from papers in my possession that on March 1, 1883, the Edison Indian & Colonial Company paid you \$25,000, in money, plus 5,000 shares of A. Stock and 5,000 of B. Stock. Did any of this go to D.M. & Co. and G.F.L.? If so, the fact that you divided said receipts with them may be deemed to have given vitality and renewed life to the above mentioned letter of March 25, 1880. But if not, have you ever done anything else to recognise the binding effect of said letter of 1880?

(5) You may remember that your above mentioned agreement of March 1, 1883, with the Marquis of Tweeddale, obliged him and his assigns to give you, at your expense, exclusive licenses for railway purposes under the patents which you had assigned pursuant to said agreement. Those licenses have been given. They were prepared so far as your interests were concerned by Messrs. Waterhouse, Winterbotham & Harrison. The agreement provided that these licenses were to be given at your expense, and the above mentioned bill from that firm is to cover said expense.

(6) Whether it is best for you to pay this law bill yourself without calling upon D.M. & Co. and G.F.L., or whether it is best for you to now call on them to pay it, and thus revive the old agreement of 1880 and thus acknowledge them as partners in your railway licenses, are questions for you to decide. If you decide to let matters stay as they are, and not to revive just now the question of participation, please send me a bill of exchange made out as above.

[PHOTOCOPY]

{7} As you know, I have spent much time of late in going through the question of who now has title to your inventions and patents in different parts of the world. The conclusions which I have reached touching Australia you may like to see. They are found in my report of July 30, 1892, entitled "Edison Patents in Australasia", a copy of which I annex hereto. Messrs Goffin and Fish have a copy of it, and will probably negotiate hereafter to acquire your railway rights in Australia &c. That event would give a cash value to these licenses prepared by the Waterhouse Law Firm, covered by said bill of \$47,18.6.

Will you kindly let me know at your early convenience just what decision you arrive at in this matter, because my firm owes a professional duty of courtesy to the London Solicitors, and should at least do them the favor, in case their bill is not now to be paid, to tell them why.

Very truly yours,



1892. Electric Light - Foreign (D-92-26)

[ENCLOSURE (PHOTOCOPY)]

Edison Australasian Patents

Mr. Edison's Preliminary Report.

July 30, 1892.

[ENCLOSURE (PHOTOCOPY)]

EDISON PATENTS IN AUSTRALIA.

Mr. Eaton's Report, July 30, 1892.

NEWZEALAND, NEW SOUTH WALES, VICTORIA, QUEENSLAND, SOUTH
AUSTRALIA, TASMANIA, WEST AUSTRALIA, NATAL, CAPE OF GOOD
HOPE and elsewhere in AUSTRALIA and SOUTH AFRICA and in
INDIA AND CEYLON.

Who owns the Edison patents for the above
countries?

The Brush Electrical Engineering Co., of London
owns all patents and inventions up to June 12, 1887, for
or relating to the "application of electricity or magne-
tism as a lighting, heating or motive agent". There is a
possibility that this Company may be entitled to a six
months' option upon inventions made subsequent to that
date, but this is very doubtful and may be disregarded.

Are electric railway patents included in the
above?

They are not. Under Mr. Edison's contract con-
cerning the above territory, it is provided that he shall

[ENCLOSURE (PHOTOCOPY)]

have a free and exclusive license for the use of all the patents for the purpose of "locomotion only, on railways or tramways or on common roads". That refers, no doubt, to patents or inventions which, like the dynamo, are susceptible of various uses, i.e., for instance, for lighting, heating and stationary power, as well as for railways. No mention is made of inventions which are solely and exclusively applicable to railways, and in view of the above provision regarding license, I am of opinion that Mr. Edison is entitled to retain the full title to all inventions relating exclusively to electric railways. Mr. Edison has received from the Brush Co. a free and exclusive license, under seal, to use for electric railway purposes all patents which he has heretofore assigned to that Company, all of them being of the class first mentioned above, namely, susceptible of various uses.

What title can a third party acquire?

As to all patents and inventions of a later date than June 12, 1887, Mr. Edison can, I think, give good and entire title. As to all of an earlier date, he can give good and entire title for inventions relating exclusively to electric railways, and can give a free and exclusive license for railway purposes, touching inventions susceptible of various uses.

Legal

Edward E. Quimby,
59 Liberty Street,

New York, Sept. 25, 1893

Dear Mr. Dyer,

Mr. Matthiessen writes from Chicago that he will return to New York this week and will then call a meeting of the Weston directors and decide what is best to do about the arbitration.

Yours truly
Edw. E. Quimby.

To Richard M. Dyer, Esq.,

36 Wall Street, City.

Mr. Edison
This shows status
of arbitration matter -
Please return. R. M. Dyer

1898. Edison, T. A. - Family - General (D-98-06)

Telegram; Akron, Ohio. July 11th, 1898.

President McKinley,
Washington, D.C.

I have just received a dispatch that my son Theodore W. Miller, Troop D. Roosevelt's Rough Riders was wounded and died on the eighth. Can my son John V. Miller on Naval boat Trilean be detached and bring remains home if possible.

Lewis Miller.

Executive Mansion, Washington, D.C. July 11th,
1898.

Mr. Lewis Miller,

Akron, Ohio

Very deeply sympathize with you in the loss of your gallant son.

Have said to the Secretary of the Navy that this be done unless there is some commanding reason why your request can not be complied with.

Wm. McKINLEY

Cable

John V. Miller,

U.S.S. Trilion,

Playa del Este.

Cable particulars Theodore's death; where is Dade Goodrich?
Gardner Lewis Edison's special friend.

Lewis Miller

Telegram

Akron, Ohio. July 12th, 1898.

Hon. Secretary of the Navy,
Washington, D.C.

Can you comply with the President's request to detail Ensign John V. Miller to bring home body of his brother Theodore W. Miller. Is there anything to be done by the family to accomplish this.

Lewis Miller.

1898. Edison, T. A. - Family - General (D-98-06)

Telegram

Washington, D.C. July 14th, 1898.

Lewis Miller

Assistant Engineer Miller will be granted leave to take charge of remains of brother. Crowinshield.

Cable

Playa Del Este, July 13th, 1898.

Lewis Miller,

Akron, Ohio.

July first shot shoulder. Died Army Hospital Sibony. Will go there for information and obtain remains if possible. Leave all to us. Dads Well and with army around Santiago.

John

Cable

Washington, D.C. July 13th, 1898.

General Shafter,

Cuba.

Theodore W. Miller, private in Rough Riders, was wounded on the first and died on the eighth. His father, Hon. Lewis Miller, of Akron, Ohio, desires very much to recover his body. Casket will be placed on board the first ship out of New York marked in your care. The son who will take charge of the body is an Ensign and engineer assigned to the Marblehead. If in your great strain of cares you can send for Mr. Miller when the casket arrives I shall consider it a great favor. Of course you will detail an officer to look after the details.

R.A. Alger,

Secretary of War.

1898. Edison, T. A. - Family - General (D-98-06)

(2)

Letter

Washington, D.C. July 13th, 1898.

My dear Sir:-

I deeply sympathize with you in your great affliction, and will be glad to aid you all in my power to recover the body of your son who was killed in front of Santiago. This is the direction I would suggest :

Get casket plainly marked, with name of deceased on it, stating rank, company and regiment, addressed to Major General Shafter, and placed in hands of Colonel Kimball, chief Quartermaster, New York. And this is the order that it be forwarded by first ship.

Sincerely yours,

R.A. Alger,

Secretary of War.

Hon. Lewis Miller,

Akron, Ohio.

Telegram

Coast Signal Office

Washington, D.C. July 13th, 1898.

Assistant Engineer Miller,

"Marblehead "

care of Sampson, Playa Del Este,

See Shafter for Alger's order, Coffin sent from New York, care Shafter, embalm body. Address Edison's

Father.

Letter

New York, July 14th, 1898.

1898. Edison, T. A. - Family - General (D-98-06)

(3)

This letter will be handed to you by the Hon. Lewis Miller, Akron, Ohio, who is desirous of procuring a casket for his son who died in hospital in Siboney, Cuba. Please have the casket addressed as follows:-

"Theo., W. Miller, Troop D., First Vol., Cav., Rough Riders." This casket and outside rough box to be delivered at Pier 3 East River, New York City, marked "Care gen., Shafter, Santiago de Cuba," and to be received by John V. Miller,

Respectfully,

Geo. F. Otis,

Purchasing Clerk,

Q.M. Dept.,

- 1 Black Cloth Casket, Oval Top, Copper Lined, Trimmed, Handles Plate engraved, Pine Box
To be put on Steamer, Pier 3, East River at 2 p.m. marked
"Casket for remains of Theo., W. Miller, Troop D., First Vol. Cav., 'Rough Riders,' Care gen. Shafter, Santiago, de Cuba,"
To be received by John V. Miller, Assistant Engineer Ensign.

New York July, 14th, 1898.

Received from National Casket Co.,

(Lewis Miller)

For the remains of
Theodore V. Miller
Troop D 1st., Vol. Cav.
Rough Riders
c/o Gen. Shafter
Santiago de Cuba
to be received by John V.
Miller, Assist.,
Engineer Ensign.

One (1) Burial Case
on S.S. Berlin.

1898. Edison, T. A. - Family - General (D-98-06)

(4)

Telegram

New York, July 15th, 1898.

Engineer Miller,

Marblehead

c/ Sampson, Playa Del Este

Coffin S.S. Berlin today: telegraph route

starting.

Father.

1898. Edison, T. A. - Family - General (D-98-06)



Dear John:-

Everything has been in a disturbed condition ever since we got your first telegram about Theodore. I had hoped that we might have the remains of Theodore here by this time and worked with all possible efforts to that end; but your cable about the quarantine at Siboney makes it pretty definite that it will be some time before we can get Theodore's remains home. Of course that will also prevent your coming soon as we hoped you would. I enclose you copy of the different papers which will show you the efforts made at this end and all the arrangements that were made. I have been very thankful that everybody has been so kind from President McKinley down. They have done everything they could do for us. Sympathy has been extended to us from everybody. It has been a great shock. Day before yesterday we got a letter from David V. McClure who evidently was a cowboy and a man in Theodores squad; I enclose a copy of it; it shows how Theodore had won the heart of this cowboy. The same day we got a pocket memorandum book which Theodore had filled containing a full history of every days doings since he left New York which is very precious indeed. I will send you the "Beacons" which contain it almost verbatim. The "Beacon" people thought so much of it that they at once offered

1898. Edison, T. A. - Family - General (D-98-06)



(2)

to print the whole thing entire in their paper but it was so long that after looking it over we decided it was best to print it in three sections instead of filling a whole paper with it. We feel the loss most deeply. I really gave him up when he entered the army and it was only a kind of second shock but it came so unexpectedly that we felt it almost as though we had not surrendered him when he enlisted. Mother and the girls were in New York at the time. Ed and I were alone at home and that is still the case. Mother is with Mina and the girls ^{were} with the children at the sea-shore as arranged before you left. The girls are now at Minas again since they have heard the sad news. I am going to New York tomorrow and will stay at Mina's with mother over Sunday. I have some business in Connecticut Tuesday and go in advance so as to spend Sunday with mother. I have been surprised at the courageous way in which mother has received the shock. It was the morning when Mina brought us a new boy and it had to be kept from Mina. Mother would go out in the other room and cry awhile and then come back with cheer and comfort for Mina with her great burden. It was so from Monday until Saturday. When I heard the news I started at once as you will see from the enclosed with telegrams but not.

1898. Edison, T. A. - Family - General (D-98-06)



(3)

resting satisfied with that I went to Washington and followed it up until I had full arrangements made with Secretary Long and Secretary Alger and the President and the various Departments. I am very sorry the quarantine interferes but can appreciate how absolutely necessary it is to have it. I hope you will not necessarily expose yourself because of course now the body cannot be embalmed and we will get it home in whatever condition it may be in due time.

Laying aside this sorrow and grief, everybody is rejoiced at the great work the army and navy has accomplished. There has been most wonderful rejoicing. The shops have been moving along and we got through wonderfully fine. The machines worked splendidly all the way through. Are now taking our inventory and preparing for another season.

We are watching every mail hoping to get full letters from you about Theodore's last days, from the day he was wounded until the end. He seemed so hopeful on the 7th as you will see from the McClure letter and seemed to have such encouragement from those about him that we cannot understand just what happened that took him away so suddenly. The diary he sent seems to come right up

1898. Edison, T. A. - Family - General (D-98-06)



(4)

to the day he was wounded. It shows how readily he adapted himself to all his surroundings, how he was beloved and worked himself into the good graces of all, even to the Colonel.

I will not go to Europe unless later on. Am making my first work that of looking after my family. We do not understand your first cable that you were transferred to the boat "Trilion" or "Trileas". I could find no such boat on the navy yard records in Washington. Is it the tug "Triton" or the repair ship "Vulcan"? the cable was probably "bullied" in some way. Also you say Gardner Lewis is the commanded; is it Gardner Sims? Have had no letter since you got to Santiago and are looking for one daily which we hope will tell us just how you are situated.

Father.

July 22nd; Your father went east this noon; I will mail the "Beacons" tonight. I think your father will go to Europe. He is waiting to hear how long it is likely to be before you can bring Theodore's body back. Tom Marshall dropped dead of apoplexy Probably at six o'clock this morning. All the boys here have ~~asked~~ asked to be remembered when writing to you. Walt.

*Your cable about Bence. Your cable about Bence rec'd
I am today —*

My Dear Mr Miller

I am informed by the
representative of Maj LaGarde that all of
your brothers effects have been destroyed
under the general order issued by the
Department at Washington the object of
which was to prevent any possibility
of germ infection getting out of Albany.
The ceremony at his funeral was conducted
by the Chaplain who is stationed at the
hospital. I cannot recall his name. The

2

grave is on the hillside back of
 Siboney. As you approach Siboney from the
 sea you will see a path leading up the
 hill to the west. Half way up this hill is
 a blockhouse or the charred ruins of a
 blockhouse so you cannot mistake it. At
 the top of the hill there are the graves of
 the men who fell in the fighting near
 Oatleys. Your brother is the first ^{that you meet} on
 the left hand side of the road. There
 is a board at the foot in which is

3

printed his full name. At the head of the
grass not more than a foot from the
surface in a bottle in which are the
details of his ~~death~~ wounding and death
and descriptions by which his identification
at any time is certain. I inquired about
the bodies of Hamilton Fish and Capt Capron
and was informed that they had been disinterred
and sent home. Sympathizing with you in
your affliction I am sir

Yours Very truly
Willbur J. Chamberlin

1898. Edison, T. A. - Family - General (D-98-06)



AKRON, OHIO. August 1st, 1898.

Dear John:-

I have been so full of grief and feeling sure you would soon be with us bringing Theodore's body I really have neglected writing you as I should have done. We have now got quite a good deal of information in regard to Theodore's last days. We have a letter from David McClure, one of the Rough Riders, the last letter written before Theodore died and Theodore dictated a part of this letter as you will see in the paper I sent. Since then we received a letter from Frank Knox, also a member of Theodore's squad, who was in Siboney Hospital and was there when he died. He tells us that Theodore was quite rational on the 7th when he dictated the letter but was quite feeble. He himself was sick and lying alongside him and heard what McClure had written and what Dr. Leseur said and he said he did not understand why they should write that way when Theodore was so seriously wounded and so feeble. I saw Knox in New York last week; he came up on the "Breakwater" with the wounded and sick, he having been one of the sick. We found him on the steamer and afterward had him come over to Orange and dine with us one evening. The girls and mother had a nice talk with him. He said he talked with Theodore and Theodore was a little anxious to get some money and told him that Capt. Houston had some of his money and still another man had some of his checks so there must be some money there somewhere so that, if you can get communication with Capt. Houston you could probably get the money. In addition I would get all his effects together and send home such things as you think proper. Knox says the Chaplain came to him and asked him about Theodore after Theodore had died and he gave him his name, regiment, etc and that the chaplain wrote it down and put it into a bottle and corked it up and buried it with him; also put a shingle at the head of his grave with the inscription. I have this morning a letter from Capt. Feederle which states still more about Theodore's grave. There is one great consolation and we are all rejoiced in our grief that we have so full information about Theodore and the care he received after he was wounded. He was carried off the field by four men detailed for the purpose. I have their names but not here at the office.

It is just possible that if you had a few immunes who are not subject to yellow fever they could go there and get the body by special order from Gen'l Shafter, then have the coffin thoroughly fumigated. The coffin was sent in care of Gen'l Shafter and must be there by this time. It is a copper coffin, which can be hermetically sealed and was encased in a wood coffin, cloth outside, in



(2)

AKRON, OHIO.

fact the same pattern as the coffin that Fish took with him down there. After the body is in the coffin and hermetically sealed, there can be no danger from that source and the only danger there could be would be the outside of the coffin which certainly can be fumigated to make it entirely safe to have it placed on board a ship. I think if this was done by immunes, you might be able to come home with the body. Consult Capt. Sims freely and follow his advice and do nothing that will endanger you in any way; because now that we have lost Theodore the great care must be for the living. We hope you will return in perfectly good health. We are all glad you are on the ship "Vulcan" and from our impressions of that ship think you have got a great opportunity especially so long as you are with Capt. Sims who will certainly take great interest in you. It certainly may not be quite so exciting as to be on a regular war ship but you have an opportunity to see al that is now to be seen in the way of naval engagements and your ship must be more or less active all the time.

We are all bearing the grief with remarkable fortitude. Jane is probably the most heavily affected. Mina bears it remarkably well and lives in the many pleasant memories that Theodore has left in all his active life and she does not mourn over what is now unavoidable. Jane takes it to heart and it is hard for her to give up. Mother has borne it wonderfully well but has finally been worn out with Mina's care and the grief and had quite a little time in the way of dysentery. She has eaten so little it has made her quite weak. I brought her home from Mina's arriving here last Friday morning. She was quite comfortable on the way coming home but since then she has kind of let down and we had to keep her in bed. Got a nice nurse for her and she is doing well. She thinks she can come out today but we are persuading her to stay in a few days more and hope she will, when she will be herself again. The girls remained in New York and will stay there for a few weeks and then they will come home.

Harvest here is just about over. Have a little oat-cutting this week when I will be through for this year. Am going to Chautauqua tonight and will stay there a couple of days and then come back again. All send their best wishes and great love to you and hope you will return well and happy. You must live in Theodore's good life. The diary is such a comfort to us. Everybody who knew Theodore has sent letters of sympathy so amid our grief we have a great deal to comfort us. We must be happy in the reflection that Theodore's life was a noble one and he is now in the better country.

Father.

New York City
December - 19th 98

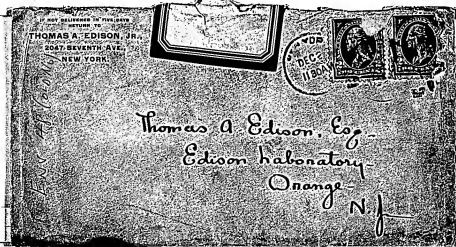
Thomas A. Edison. Esq -
Orange - N. J.
Dear Sir -

I am at loss to understand -
why in every case I have written to you regarding
anything - whether of a business nature or a personal
one - that you should employ a representative to
communicate your opinions on surmises - instead of
addressing yourself to me personally - however I
understand this is one of your characteristics - and its
motive perhaps can be understood later on -

To have justified reasons compelling me to communicate
the following remarks to you is indeed a sorrowful condition
of affairs - and is a deep cause to us both - from not only
one - but every point of view -

I worked for you faithfully and obediently until I
was actually compelled to leave the best friend I
thought I had - but now as I look back upon those
days - what an ass - what a fool I was to devote my
time to a man - whose domestic attentions are foreign
things to him - and who has no more right in this world
to be a father - than a youth of six -

That time was waste - absolute waste - but since
I left you - I know more - than if I had been associated
with you forty years - you have tried to down me



which is indeed - indisputable - but with all your imaginative successful endeavors - I shall prove - that your influence with the outside world is nothing - with a public that is with the youth.

If in your opinion. Based upon facts gained from men you have ^{every} ^{paid} to ascertain the truth - I have disgraced you and your family - wait - you will think I have been an angel - before many days pass by - for I have dealt with you as a father - and not as I shall do hereafter - like an ordinary individual -

I give you full credit - so does the world - for your wonderful achievements towards the advancement of science - but the public know as well as I you cannot down an aspirant for the same honors bestowed upon yourself - no matter who he is - whether his name be Edison - or Smith.

Where you have lost money - I propose to gain it - and I have not - and am not posing as the inventor of a single thing - bearing my name to-day - this is my method of learning business - and if I do originate any useful article - I will know how to handle it - you should have been - "ask any body" - a million times over - if you knew how to handle your own achievements - what have you to-day - ask the financial world - they know.

I have no desire to enter into any arguments with you on anyone else - so I shall not say

anything in answer to your representative's letter received yesterday afternoon - further than to say - that I would not use your name - unless I had your permission - but the enterprise regarding the proposed show and exhibit of your apparatus throughout the country - and which I spoke to you about - shall go on just the same as ever -

You say you have got enough of me - very well - perhaps it is just as well for you - but I shall deal with you - man to man - and not father to son - let this be understood now and forever -

The world will go on just the same - I shall go on just as I have been doing - until the law only compells me to stop - then I must stop - not before -

Your name has been a detriment to me from the day I started out - and always will be - where would I get any credit? no where - what ever I get up and will get up in the future - you are and will be the inventor - and you have given it to your boy to go ahead - ask anyone in the universe if this is not the opinion -

If your name was worth anything to me - why have I not money to-day? why haven't

men - these so called scoundrels - the very men who would make money out of your name - why haven't they made money? if your name was worth anything? it is not - people are through putting money into your inventions - and as a consequence - they are through with the name of Edison - for good - otherwise I would be a rich man -

If my name was Smith - I would be a rich man - today - and I propose to have it changed - having sufficient reasons - that the law will grant my request -

When I asked you to endorse a note for me - and take those worthless papers back which were given me - when I was an infant in the hands of the law - do you suppose for one minute I thought you would do it? no indeed I did not think of such a thing - once - I gave you that money - because you were in need of it at the time - I did it willingly - I did not have to do it - and this is what I get in return - some one will feel sorry - but I shall get the full amount you took from me - and get it very quick - whether from you - or some one else -

I do not care to have anything to do with you in anyway - and so being - consider this my last personal letter -

I shall enclose your representatives letter

as I do not care to have such nonsense in my possession -

very truly
Thomas A. Edison Jr

P. S.

I understand you think I have got a "big head" if you reason it out you will come to the conclusion that I have done nothing or accomplished anything that would in any way give me a "big head" consequently it is ridiculous -

as to marrying - that concerns no one but myself

Edison Jr

1898. Edison, T. A. - Family - Edison, T. A., Jr. (D-98-07)

Both Address
"Edison's New Style"

From the Laboratory
of
Thomas A. Edison.

PHONOGRAPH DICTATION.

Orange, N.J. _____ 189

My dear Tom.

Father wishes for me, to say in answer to your letter that he does not want you to go around the country using his name as a drawing card and if you attempt to do so he will send a lawyer in to stop it. The old man says he is through with you and that you have disgraced him enough. also he says that you are in debt and furthermore that you have married this actress. He don't care so much for that as the way you have treated him and lied to him. Sorry he has so bad an opinion of you. Trusting you are much better I am
your loving brother
Bill. B.
T.A.E.

1898. Electric Light - Edison Electric Illuminating Company
Of New York (D-98-15)

[PHOTOCOPY]

The Edison Electric Illuminating Company of New York.

General Offices, 53, 55, 57 Duane St.

COMBINED EARNINGS, J U L Y, 1898.

(Inclusive of High Tension System.)

	1898	1897	Increase
Gross Earnings	\$ 196,400.50	\$ 162,453.48	\$ 33,947.02
Operating & General Expenses, incl. Taxes	112,348.20	91,418.98	20,929.22
Deprec'n Charge	17,500.00	12,000.00	5,500.00
Net Earnings	66,552.30	59,034.50	7,517.80
Accrued Interest on Bonds	27,075.00	27,075.00	
Capital Stock	9,077,000.00	7,938,000.00	1,139,000.00
Mortgage Bonds	6,500,000.00	6,500,000.00	

	Edison Co.	Manhattan Co.	Total
Gross Earnings	\$ 160,555.21	\$ 35,745.29	\$ 196,400.50
Expenses	102,485.02	27,363.18	129,848.20
Net Earnings	58,170.19	8,382.11	66,552.30

RETURNS FOR 7 MONTHS.

	1898	1897	Increase
Gross Earnings	\$1,738,123.46	\$1,391,219.79	\$ 346,903.67
Net Earnings	751,760.07	630,749.02	121,011.05
Interest on Bonds	189,525.00	189,525.00	

	Edison Co.	Manhattan Co.	Total
Incan. Lamps, 16 c. p. equiv. end of month	328,901	37,225	366,207
Arc Lamps, number	4,391	2,170	6,561
Motors H. P., number	22,657	81	22,738
Total 16 c. p. equiv.	720,017	60,141	779,835

SUPPLEMENT
LEGAL SERIES
MISCELLANEOUS LEGAL FILE

[THIS EXHIBIT IS PART OF THE 1888 CONTRACT BETWEEN EDISON
AND HENRY VILLARD ON REEL 145, FRAMES 276-282]

EXHIBIT "A".

1. A Cotton Picker, to do for cotton what the Mowing Machine has done for serials.

A great number of experiments have been made with the view of producing such a machine. The demand for such a machine is very great and I have frequently been requested to experiment with the view of inventing such a machine. I have conducted a number of experiments and believe they will result successfully. I expect to build a small experimental machine this summer.

2. Apparatus for deaf people, to increase audition.

I have been working on this for eight years, and have received not less than 10,000 inquiries concerning the progress of my experiments. I believe I can perfect such a machine.

3. Improved Battery for General Service.

The sales of batteries in this country amount to over a million dollars annually. They would be three times as large if a good battery could be obtained. I have conducted a number of experiments on such a battery and believe I can perfect one.

4. Increasing the speed for Signalling of Submarine Cables, to permit the use of a Cable direct from New York

to London at one third of the present cost.

All the conditions of cable signalling are well known and point to a certain direction in which to work. I have conducted a number of experiments on this subject and believe they will result successfully.

5. Electro-deposit in high vacuo, for commercial use, to replace the present electrotype system.

At the present time there is probably invested in this country in the electrotype industry over Five Millions of dollars. If I could perfect the process upon which I have been experimenting and have in mind, its value would be very great.

6. Artificial Silk.

For the past eight years I have at different times conducted a number of experiments, with the view of making silk artificially. I feel quite confident from the experiments I have conducted, that I will be able to make silk artificially. It will take considerable time however to perfect my work in this direction. The value of such a process would be enormous.

7. Malleablizing Cast Iron cheaply.

Could the time be reduced, required in mallea-

blazing iron, from one week to a few hours, the saving in this country alone would exceed Ten Millions of dollars. I have conducted a number of experiments on this subject. The results are very satisfactory and I am continuing them.

8. Drawing fine sizes of brass wire and sizes where there are forty per cent duty.

Forty thousand pounds of such wire are used in the United States weekly. Could it be manufactured here a great saving would be effected. I am now making an apparatus to do this work and from the experiments I have heretofore conducted, I am sure the process I have in mind will prove a success.

9. Snow pressing machine for cleaning streets.

I have tried the preliminary experiments and have made the complete working drawings of my invention for this purpose. It costs New York City over \$50,000 to clear the principal streets after each snow storm of six inches fall. A machine drawn by six horses sweeps up the snow and presses it into square blocks of ice as the horses walk. This enables the carts to carry four times the load they do now. The blocks can be temporarily

piled up in the gutter as paving blocks are now done.. Such a machine would greatly reduce the cost of clearing the streets from snow, according to the methods now practiced.

10. Refining Copper Electrically.

I have conducted a number of experiments on this subject, at the request of the Parrot Copper and Silver Company. The yearly output of that company is Three Millions of Dollars, and each ton of copper contains \$65. in silver.

11. Cutting Ice and Wood by Electricity.

This is an old idea, but I am trying to make it practical. I believe under proper conditions pine, lumber trees, and other large standing trees can be cut for much less money by this process than any other.

12. Manufacture of cheap Bolting Cloth.

Bolting Cloth, as now manufactured, is made of silk and sells for from three to four dollars per yard. I have a method of cheapening it, which I believe will prove successful.

13. Manufacture of Sheet Glass and Tubes.

My work in this direction is entirely original and if successful will completely change the

[THIS EXHIBIT IS PART OF THE 1888 CONTRACT BETWEEN EDISON
AND HENRY VILLARD ON REEL 145, FRAMES 276-282]

present methods of working window glass and will be
very valuable.

14. Artificial Mother-of-Pearl.

I have been working on this for some time and
have obtained fair results. I have and can pro-
duce surfaces on metallic foil as cheap as news-
papers can be printed. The Mother-of-Pearl sur-
face can be given to a sheet of metallic foil as
cheaply as a sheet of paper can be printed from a
block of type.

15. Cheap India Ink.

I have about perfected this invention. This
ink is now imported and sells at quite a high price.
My process of manufacturing it is a very cheap one
and will result in large sales in this country.

16. Ink for the blind.

This is an ink which on contact with the paper
swells up enormously and hardens. From my experi-
ments, I believe this invention will be perfected
at an early day.

17. Regenerative Kerosene Burners.

I have conducted some few experiments on this
and have obtained fairly good results.

18. Coal Sorting Machine.

[THIS EXHIBIT IS PART OF THE 1888 CONTRACT BETWEEN EDISON
AND HENRY VILLARD ON REEL 145, FRAMES 276-282]

This is an extremely difficult invention to make, but if a machine which would sort coal could be perfected, its value would be very great. I have conducted a number of experiments on this subject and with promise of good results.

19. Butter Direct from Milk.

The large Butter-making Machine Companies have repeatedly communicated with me, requesting that I take this subject up. I am informed the dairy industry in this country represents \$450,000,000 annually and that the present processes used in the great creamery establishments are very bad. I have been trying some modern ideas on this subject and believe I can produce something very valuable.

20. Artificial Ivory.

I have been making this for some thirteen years past, at intervals. I have perfected nothing as yet, but believe that ultimately I will succeed.

21. Magneto R. R. Signal System.

I am conducting experiments on this at the present time, with promise of good results.

22. Electricity Direct from Coal.

I have at the present time twelve men at work

on this subject and I have obtained some excellent results. A practical solution of this problem will change the entire motive power and lighting of the world. The value of such an invention would be almost incalculable.

23. Decarbonizing pig iron electrically.

I have conducted many experiments on this subject, but have some ideas which I think are of value, and propose taking it up at once.

SUPPLEMENT

SCRAPBOOK SERIES

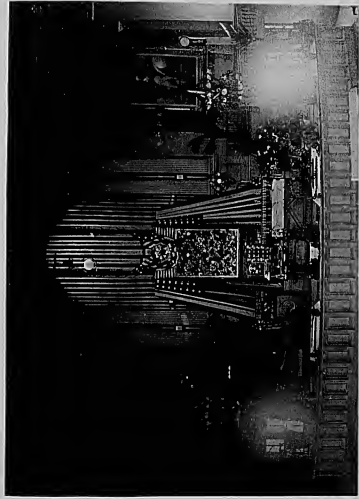
Scrapbook, Cat. 116,993

This scrapbook covers the period April-May 1884, with a few additional items from May 1896 and August 1909. Included are typewritten transcriptions of local newspaper reports, editorials, and advertisements relating to the exhibition of Edison's inventions at Mechanics Hall in Worcester, Massachusetts, on May 1-2, 1884. There is material pertaining to a visit with Edison in New York prior to the exhibition, as well as photographs of Edison's exhibit and descriptions of Edison, Sherburne B. Eaton, and Edward H. Johnson at the event. A series of illustrations in the middle of the book contains views of the sites shown to Edison and his party while in Worcester: the Mechanics Hall, the Antiquarian Society, and the Natural History Society; the Worcester Academy, Worcester Polytechnic Institute, and Clark University; and various manufacturing establishments. At the end of the book is a transcribed article from the Worcester *Sunday Spy* (1896) relating to an interview with Edison at the West Orange laboratory, along with a clipping from the *Boston American* (1909) containing images of technological and racial supremacy. The scrapbook was compiled by W. H. Raymenton, president of the Worcester Natural History Society and an organizer of the exhibition. It was presented to Edison in 1916 by Raymenton's son. The cover is stamped "Edison — in — Worcester — 1884." The spine is stamped "Edison in Worcester Electrical Exposition 1884." The pages are unnumbered. Approximately 120 pages have been used.

Thomas A. Edison.

From

W. H. Page



Stage of Mechanics Hall.
Edison Electrical Exposition May 1st and 2nd 1884. Electric Lamps Unlighted.

Exhibition of the
Electric Light
Stage of Mechanics Hall



Stage of Mechanics Hall.
Edison Electrical Exposition May 1st and 2nd 1884. Electric Lamps Lighted.



"He threw double sevens."

EDISON IN WORCESTER.

A compilation of the Newspaper Articles
published at the time of the Electrical
Exposition of Thomas A. Edison
in
Worcester, Mass.

May 1st. and 2nd. 1884.

With illustrations of the buildings visited by
Edison and Party.

Compiled by
W. H. Raymondton,
President of the Worcester Natural History Society,
Worcester, Mass.

1884.

EVENING GAZETTE.

Worcester, Mass.

Friday Evening, April 18, 1884.

Hon. S. E. Hildreth, President of the Mechanics Association, Dr. W. H. Raymenton of the Natural History Society, and several other Worcester gentlemen are in New York, to-day, visiting Mr. Edison, and inspecting his incandescent light and other modern uses of electricity. They will visit Menlo Park during the day.

WORCESTER DAILY SPY.

Saturday, April 19, 1884.

The President of the Mechanics' Association, ex-Mayor Hildreth, and the President of the Natural History Society, Dr. Raymenton, with several other Worcester citizens, have been in New York for the past two days, inspecting, under the guidance of Prof. Thos. A. Edison, the latest modern uses of electricity as applied to lighting, motive power, domestic and other purposes. Yesterday they visited Edison's laboratory at Menlo Park and saw the electrical railway, the original phonograph, and the thousand and one modern appliances of the coming power, electricity, and other inventions of Prof. Edison. They also arranged with Edison to visit this city May 1st and 2nd.

EVENING GAZETTE.

Worcester, Mass.

Tuesday Evening, April 22, 1884.

MR EDISON IN WORCESTER.—There is general congratulation and interest over the success of the managers of the Mechanics' Association and the Natural History Society in securing an engagement of Mr. Edison, the famous electrician, to give two Lecture Exhibitions here, of his latest discoveries and inventions. They will be given at Mechanics Hall on Thursday and Friday evenings of next week.

Mr. Edison will take personal charge of his exhibit, and has promised to bring with him from New York several of the original models of some of his famous inventions, as the duplex telegraph, the gold reporter, the phonograph, and his electrical locomotive engine, also his wonderful new invention, the electro-motograph, an instrument by means of which, tones can be sent through a telephone wire, and reproduced loud enough to be heard distinctly in the largest hall. This is something entirely new, and never heard before in Worcester. He will also bring his improved pho-

nograph, which repeats in the most distinct and remarkable manner, whatever may be said of it. Profs. Eaton and Johnson of New York, eminent electricians, will explain in the most practical and clearest manner the latest facts and discoveries in the application of electrical power to practical use. Arrangements have been in progress for many weeks, and the exhibition will be, undoubtedly, an unqualified success. It is a most notable event to have such a man as Edison visit the city for such a purpose, and too much credit can not be given to the perseverance and hard work on the part of the gentlemen who have made it possible for the public to enjoy the treat in store for them.

EVENING GAZETTE.

Worcester, Mass.

Wednesday Evening, April 23.

The representatives of the Worcester Mechanics Association, and the Worcester Natural History Society and the gentlemen who accompanied them in their recent visit to New York, on the matter of the forthcoming electrical exhibition in this city came back vastly delighted with their visit and its success. They were received with great courtesy, and as a very rare privilege, were given a tour of inspection through the manufacturing premises of the Edison companies in New York and Newark. In these nearly 1000 hands are employed giving practical force to Edison's inventions, the number of which is legion, for it would seem that at any and every point in science or mechanics to be bridged Edison's genius opens the way. The whole tour through these works was a procession through marvels of discovery, the fruit of which is coming to the world in the electric light and wonders of applied electricity only just now beginning to be appreciated. The Worcester party passed two busy days in New York and are now at work pushing actively the

preparations for the great exhibition which owes its inception to President Raymenton of the Natural History Society, with whom are co-operating fully the best forces of both organizations.

WORCESTER DAILY SPY.

Wednesday, April 23, 1884.

Mr. Edison, in an interview, tells a reporter of the New York Mail and Express that his incandescent light is in full operation in thirteen cities of the United States, while seventy or eighty more are preparing for its introduction.

The electric locomotive, he thinks, has a great future, but he doubts whether it will ever supplant steam on the great main roads. The problem which is exercising his mind at present is that of a cheaper source of electricity, or to put it in another form, a way to use coal more economically as a source of power. "We want," he says, "to get electricity from coal direct, without the intervention of boiler and engine. A good many people are at work on it. We don't see our way at all to it, but I will say it is surely possible. Zinc and other metals we can get into electricity at once, but the trouble is to do that with coal and carbon.

If we could, we would get six horse power from one lb. of coal, while with the boiler and steam engine we get only

one horse power from three lbs. of coal." If that can be done, the world will owe a heavy debt of gratitude to the man who brings it about. There seems to be no essential impossibility in the way, and the progress of invention has made many things familiar and commonplace, which, half a century ago, seemed more improbable than getting electricity direct from coal seems now. (Editorial.)

EVENING GAZETTE.

Friday Evening, April 25, 1884.

IN EDISON'S LABORATORY.

To the Editor of the Gazette:- The happy audacity with which the Worcester party, who recently visited Mr. Edison, captured him, and in spite of his decided and reiterated negative took it for granted that he would come to Worcester and make their lecture on the practical uses of electricity round and full by the presence of the first electrician of the age, and would take nothing but a positive yes for an answer, seemed to please, if not amuse him, and he allowed himself to be captivated by the earnest plea of the spokesman of the party, who, not speaking by note or by rote but by main strength, quite took him by storm, and accepting the invitation and ta-

king in the situation, he at once with great good nature, placed himself entirely at their service, and began at once to plan as to the best way to make a successful exhibit.

When once enlisted, nothing could have been more cordial and helpful than his manner and suggestions, and he ran their cup of gratitude full to overflowing when he gave an order to the General Superintendent to pass the Worcester gentlemen through the laboratory and workshops; a most unprecedented thing for him to do, as was afterwards learned, as many of the processes are only in their experimental stage, of course unpatented and therefore have to be most jealously guarded.

To enumerate all the various instruments, inventions and work going on in his laboratory would fill a book and I have here only a leaf from the record of my memory. On a table were the works of the famous gold and stock reporter exposed to view. In the center of the room was the improved phonograph whose wonderful powers we were soon to learn.

The marvelous megaphone by which you could hear the rustle of a man walking through the grass or a cow chewing her cud in the meadow a mile and a half distant; the various appliances for the improving the sending of telegraphic messages; the ingenious multiform writing leaves; the specialized electrical incandescent lamps for domestic, mechanical and surgical purposes. For instance, the mild, soft light by

which a lady sits and reads by night, means so much power; the way by which this can be applied has been discovered, and by an ingenious instrument attached to a sewing machine the same wire which is attached to the electric lamp can be unscrewed and connected with the sewing machine and run it, thus giving light by night and power by day.

The surgical lamp enclosed in an air-tight tube hangs the carbon filament glowing but only slightly warming the glass; this is passed into the throat for examining the organs there; the dental lamp, a miniature lamp about the size and shape of one's thumb nail, flat and about one fourth candle power which is placed in the mouth for spacial dental work, electrical jewelry on the same general plan, the unique electro motograph or loud talking telephone. But we were specially cautioned not to "give away" all we saw and I am getting on dangerous ground where "I burn." Perhaps, however, Mr. Edison will bring to Worcester some of the things I have not mentioned. If he does not it will only be because he was not asked for he certainly promised and gave all that the Worcester party did ask him, and they were not at all backward in coming forward with their requests, as I think will be quite exemplified when Mr. Edison arrives with his exhibit. (W. H. Raymenton.)

ELECTRICITY.

An Illustrated Lecture

at

MECHANICS HALL,

Thursday Evening, May 1, 1884.

Under the auspices of the

WORCESTER COUNTY MECHANICS ASSOCIATION

and

WORCESTER NATURAL HISTORY SOCIETY.

Electric Motors, Electric Motograph, Electric Arc Light,
Edison's Electric Incandescent Lamp, Edison's Original
and Improved Phonograph, Edison's Loud Speaking Telephone,
Will Be Among The Wonders Of The Exhibition.

THOMAS A. EDISON,

The World Renowned Inventor and Electrician,

Will be present and take charge of

THE ELECTRICAL EXHIBIT.

The Modern Uses Of Electricity
Will be illustrated and explained by eminent
Professors and Electricians of
world-wide repute.

ELECTRIC MOTORS,

For manufactory and domestic purposes,

ARC LIGHT and INCANDESCENT LAMP,

All seen in full operation.

Tickets with reserved seats, at 25 cents and 50 cents,
can be obtained by members of the Mechanics' Association at
the Box Office, Mechanics' Hall, and by members of the Natu-
ral History Society at the Museum, Foster St., on Monday,
April 28th, from 9 A. M. to 9 P. M., and by the general pub-
lic on and after Tuesday at Putnam & Davis'.

WORCESTER DAILY SPY.

Saturday, April 26, 1884.

THOMAS A. EDISON.

An interview with Mr. Edison cannot fail to impress one
with his very notable peculiarities. He is entirely unaf-
fected in his manner and very direct in his conversation. He
appears to be more eager to learn than anxious to impart, and
immediately comprehends the full measure of what is said af-
ter which he does not rehearse and descant upon the theme,
nor appropriate the idea in his own language, but manifesting
his assent passes on to other topics. In this respect Edi-
son is like Humboldt, who was too great a man to affect supe-
riority and too keen sighted to require lengthy explanations.

S. S. Jr.

Stephen Salisbury, Jr.

"THE WONDERFUL LAMP."

The story of Aladdin, or the Wonderful Lamp, marvelous as it reads in the Arabian Nights tale, but exemplifies the old adage that "The truth is stranger than fiction," when compared with the modern story or statement of facts of Edison and his wonderful lamp. Aladdin's palace was but a magnificent toy, with its banquetting hall and the "four and twenty bejeweled windows," where the idle hours were passed in passive pleasures, served by soft footed slaves, amid song and feasting, flowers and wine, where, on couches of blue and gold spangled with silver and sown with pearls, inglorious laid, the prince of the eastern tale lived selfishly at his ease through all his useless, dreamy, petty life. Compare with this the surroundings of the hero of our western tale, Edison, the world renowned inventor, as he may be seen in his office palace on Fifth Avenue, New York, the centre of a score of active agents with busy brains, executing the plans and purposes of the central thought, which we see realized in the great workshops filled with a thousand men, skillfully working out in tangible and useful forms the original ideas of the master, which give new light and life to the world, and are ever increasing boons and blessings to our race.

But I commenced to write of the "Wonderful Lamp" that I saw in Mr. Edison's business office. Suspended over the desk in the office is an immense Japanese umbrella, projecting from whose rib lips are 20 B or 8-candle power lamps, which are equivalent to ten 16-candle lights. Depending from the umbrella handle, and four or five feet above the desk, is a Bergmann artificial flower electroliter, with 9 16-candle lamps, wreathed in among the flowers in vari-colored bell-shaped shades. The flower globe is of white glazed porcelain, rising from which is a shaft of gold colored gas piping one inch in diameter, which was substituted for the umbrella handle below the braces, and the whole setting decidedly artistic. Inserted in the floor, just inside the keyhole of the desk, are two switches worked by the feet, the right hand switch turning on or off the current to the rib lip lamps, and the left one performing the same office for the electroliter lights, the extinguishing being done by pressing out a spring, and the lighting by pushing in a metallic button. The effect is magical, and a source of great wonder to the uninitiated. Several feet to the right of the desk, but in the same circuit with the umbrella lights, and affixed to one of the uprights of the building, is an ingenious electric cigar lighter, devised by Mr. Edison. The connection is made by grasping the handle of

the lighter, the bars of platinum therein glowing with a bright red heat sufficient to light cigars and cigarettes. The current is broken by releasing the lighter. The setting and workings of the light at the Edison office form one of the most attractive sights, and one might fairly consider himself an occupant of a palace more marvelous than Aladdin's, so wonderful are the workings of the system.

W. H. Raymenton.

EVENING GAZETTE.

Saturday Evening, April 26, 1884.

"THE WIZARD OF MENLO PARK."

Edison and His Work.

The genius of the past and present is no more strikingly typified than by the contrasted pictures of the mediaeval "Wizard" and the modern wise man, the ancient conjuror and the inventor of to-day. The one, robed in solemn black, surrounding himself with a hideous paraphernalia of skulls and crossbones, striving to impress his credulous dupes with the idea that he is in league with the prince of darkness, endowed by him with magic arts and occult powers for working weal or woe

on the bodies and souls of men, mumbling his mystical formulas, appeals to the superstitious and fears of the ignorant. The other, the wonder-worker of to-day, despising all mystery and its adventitious aids, standing forth in the broad light of day, speaks only to our reason, asks us not to admire or marvel at his skill, but to accept and use the blessings which are given the world. How marked the contrast, - the 9th and the 19th century. The magicians of to-day are many, but preeminent among them, embodying in himself the inventive spirit of the age, stands Thomas A. Edison, the wizard of Menlo Park.

The party of Worcester gentlemen, who had the privilege of meeting Mr. Edison last week in his laboratory, and under his guidance of visiting the extensive works where hundreds of busy brains and hands are employed, carrying out his plans and ideas, and where he is the inspiration and the head, were all much impressed by Edison, the man, and amazed at the tangible results of his labors. Menlo Park, so celebrated at one time as the Mecca of the savant and curiosity hunter, was but the nurserery where was grown the plant, which, transplanted to New York city, has developed into the scores of busy workshops, where the conceptions of his brain are materialized and translated into imperishable speech and living light.

The improved phonograph, which records with perfect accuracy the tone, quality and personal character of each individual human voice, and which can be preserved indefinitely to be reproduced as perfectly as when uttered, be it a thousand years hence, is the most marvelous invention of the age. It is no wonder that Mr. Edison regards it with peculiar pride and intends at no distant day to give it a dower of practical usefulness, the possibilities of which are not even imagined save by its inventor, who holds in store till his own good time this royal gift one day to be presented to the world.

Another of the marvels of the age is his incandescent lamp. But yesterday, as it were, the scientists of Europe were demonstrating, on paper, the impossibility of dividing the light, or making practical use of the invention.

When the critics had shown this end to be unattainable, and the utter futility of all effort, Edison quietly turns on the current and the carbon filament glows with a most convincing argumentum ad hominem, and its wonderful simplicity makes one marvel that none but a master should have discovered it. But it was the master and king of discoverers who demonstrated that it is almost as easy to make an egg stand on end as to discover a new world. These are but two of the many wonderful children born of the fertile brain of Edison, the inventor. As we passed through his busy workshops, we

were constantly made alive to the fact that "there are more things in Heaven and Earth than are dreamt of in our philosophy."

Of all the objects of interest in and about Menlo Park, with none were we more profoundly impressed than Edison himself. A young man, only 37 years of age, smooth faced, simple in appearance, active, energetic, intense, a business man, plain in dress and speech, frank, cordial and generous, his methods open as the day, the heart of his mystery honest inquiry and implicit faith in the unchangableness, truth and beneficence of the laws of nature, with a healthful optimism which gives him courage and strength to attempt the solution of the scientific problems propounded by the sphinx like spirit of the age, allowing no such word as fail, and knowing no rest till the riddle is read or the Gordian knot untied or cut. Thomas A. Edison stands to-day the foremost inventor and discoverer of the age in a realm of wonders, into which our own Franklin but looked as into a land of promise, teeming with beneficent bounties for the amelioration of the condition of our race, the possibilities of which he could not see or imagine.

Amid detraction, calumny, extravagant laudation, bitter hostility of enemies and the often injudicious partisan

ship of friends, he has modestly, perseveringly and successfully held on his way, till now he stands the leader among leaders in his special field of labor. We were impressed most vividly by his direct and comprehensive grasp of a subject, his quick appreciation of a point, his intense and absorbing interest in the special topic under consideration, as one possessing an elephantine strength, but light and graceful as the swallow in the exercise of it, with an intellect quick and clear as light, swift to perceive and act.

The visit of Mr. Edison to Worcester in the near future and the exhibition of his "wonderful lamp" and other remarkable inventions under his own personal supervision is a notable event, and reflects great credit on the management of the Mechanics' Association and the Natural History Society who have made it possible for the people of Worcester to enjoy the rare privilege of seeing the foremost inventor of the day in the midst of his works.

W. H. Raymenton.

Gazette, April 26, 1884.

The programme of the illustrated electrical lecture and Edison exhibit will be found in our advertising columns. Some of the material to be used at the lectures arrived from Edison's laboratory this morning.

NEW ENGLAND HOME JOURNAL.

Worcester Mass.

April 26, 1884.

THE ELECTRICAL EXHIBITION.

In another part of this paper illustration is given of a most interesting feature of news. Beyond all question electricity and its applications offer the most scientific and industrial problems of the age. The future in electricity no man can fully grasp, but it seems certain that the revelation of wonders has but begun. The Worcester Natural History Society, under the lead of President Raymenton, has devised a project for bringing before the people of Worcester this whole subject of the new advance of electricity. The Mechanics Association management are strongly co-operating in the movement, and as the result the forth-coming evening at Mechanics Hall early in May, will give to a Worcester audience a better and more complete illustration and exhibition of the wonders of electrical progress than has ever yet been realized in any city in the United States.

In fact on that occasion or occasions will be practically illustrated what electricity has done and is doing.

So much interest has been excited in the proposition and plan, that the presence and aid of Thomas A. Edison has been secured, and as he is the by far the largest and most prolific inventor in the field, his presence will assure the adequate presentment of the material results he has accomplished. The event is one to which our citizens will look forward with much interest. On another page we illustrate somewhat fully the features of the Edison light and its sources and mechanism. There will also be present on the forthcoming occasion some of the leading electricians and expounders of electric progress, and the whole affair will be made vivid with electric facts and illustrations.

(Editorial.)

NEW ENGLAND HOME JOURNAL.
Worcester Mass. April 26, 1884.

EDISON IN WORCESTER.

It is being received with very general satisfaction, the announcement of the preparations for a competent illustration before the public of this city, of the modern wonders of electricity in its application to the practical affairs of life. By the co-operation on this subject brought about between the Worcester Mechanics Association and the Worcester Natural History Society, will be given at Mechanics Hall, on May 1st and 2nd, a vividly interesting entertainment, for which the programme is now being prepared.

One feature of the forthcoming occasion is indicated in our caption, for the event in question is to bring to Worcester, Thomas A. Edison, to co-operate with the management on the occasion, and make, what it will prove to be, the fullest and most remarkable illustration of the applied powers of electricity ever presented in New England. It will not only exhibit the use of electricity in illumination, but its general application to dynamics, and utilitarian purposes.

Not long ago we made some reference to the electric light as introduced in Worcester streets. The electric light as at present known is of two kinds, the incandescent and the arc. The latter is the one now becoming familiar on our streets. To any one who studies its simple mechanism it shows the two pencils of carbon, lightly coated with copper, for the sake of better conduction. Across the space between these in the lamp, the strong current of electricity leaps with the brilliant flash of light made permanent between the glowing tips of the carbon. In the incandescent, or Edison light, the process is something entirely different, for there is no break in the circuit, or rather, it is only broken by the continuous filament of carbon which makes the vivid horseshoe of light in this lamp. This will be seen in the illustration given herewith in the cut of the Edison lamp. It is a pear shaped globe of glass made a vacuum by exhaustion of air, within which the electric fluid is sent through the carbon filament, whose shape is shown.

Were the same current to pass the filament in open air, it would be destroyed in a flash, but in the vacuum it glows a brilliant white with scarcely perceptible heat, and without combustion. One of these little filaments will give light for 1200 hours. The light itself is like sunlight as compared with the white intense glow of the incandescent light

which is of the type of moonlight.

The power of the Edison light ranges from 100 candle-power to the tiny beacon of a small fraction of a candle-power employed in medical science and in a multiplying variety of curious applications, including the wonderful electrical jewelry, the filament being of the same character in all, though differing in size.

This filament found by Mr. Edison after long search among vegetable fibres, is from the bamboo, a splint of which is shaved and worked down until scarcely larger than a stout thread. This is reduced to carbon in a furnace of intense heat and furnishes what has thus far proved the only available wick for Edison's lamp, if wick it may be called.

The source of the electric current is the same in principle in all the systems, and at present constitutes the chief expense of electric lighting, the steam driven dynamo machines involving the principal outlay. These dynamos are of various patterns, and that of Edison we show elsewhere. The upright columns are the arms of a large magnet between which revolve the armatures.

Without attempting a full description of the process of electric lighting after the Edison type, let us say something of the man himself. He has suffered somewhat from the efforts of the sensational press to announce what he has done,

and readers of half forgotten columns of high spiced news regarding Edison, may perhaps have gained the idea that his fame was discounted in a great expectancy only half realized.

The great public is most exacting with all its favorites and keeps only short credit accounts. Fulfilment must follow hard on the heels of promise.

The pilgrims in search of electrical wonders whose mecca a few seasons ago was Menlo Park, a station on the Pennsylvania railroad eighteen miles from New York, may as well be told that what was in this not very recent past a nursery garden of electrical ideas, has literally given developed plants to several great establishments in New York and New Jersey, the contributory departments of the Edison system, the parent corporation being the Edison Electric Light Company.

The Edison Electric Illuminating Company of New York is the city company which has for twenty months supplied a down town district containing over 12,000 lamps soon to be increased to 15,000 and comprised in the tract generally to be described as between the City Hall, Park and Wall street. These lamps are all supplied from the electric light station on Pearl St. near Fulton St.

The Edison lamps are made at East Newark in a manufactory capable of turning out 50,000 lamps daily.

The Edison dynamo machines are made in the great manufac-

turing premises on Goerck street formerly occupied by John Roach. The Edison tube works are on Washington street, where are made the strong iron tubes carrying the cable conductors of the supply system. On 17th street at Avenue B. are the extensive premises of Bergmann & Co. where are manufactured the multiplicity of small and large metal mechanisms and appliances for electric purposes, for lighting and the telephone. There are great floors filled with costly machinery and warerooms brilliant with finished product.

The floor given to the illustration of the electric light is one of the marvels of New York, a perfect hall of wonders. Throughout all these great establishments runs the genius of Edison. On every side are his appliances.

He seems to be the Man of Ross in electricity, and his inventions far from dying out in the forgetfulness of news items have taken practical form and live in the industry of a thousand or more men.

The fact is the Edison fulfilment has far outrun the Edison promise. Unlike too many of the sons of genius who have suffered and perished from hope deferred, the practical development of the Edison inventions has kept even pace with their discovery, and the visit of Mr. Edison to Worcester as one of the principal events now in preparation, will bring

to the knowledge of our citizens a very thorough review of the progress of electric science and the places in practical life into which it is rapidly arriving.

EVENING GAZETTE.

Worcester, Mass.

Monday Evening, April 28, 1884.

A DYNAMO.

A Description of the Machine.

In view of the local interest in electrical matters, the following description of a dynamo, written for the Gazette by an expert electrical engineer, is of instructive value:-

"What is the dynamo?" Within the last few days several very frank people have asked the question and have been very tersely answered by equally out-spoken friends with a brief "Blest if I know." Well, there is very little mystery about it. Properly it should be called the dynamo electrical machine and it is nothing more or less than a mechanical generator of electricity, as the battery is a chemical one.

With the dynamo coal is consumed, and through the inter-

vention of the boiler and engine, is converted into a current, while with the battery it (current) is the result of burning zinc up with sulphuric acid. In either case electricity results, but where it is required in considerable quantity, the chemical method costs somewhere in the neighborhood of twenty times as much as the dynamic.

Having established a boiler and engine, to create an electric light plant, the next step is to locate a dynamo, or generator, lead a belt from the wheel of the engine to that of the dynamo; then run the wires from the dynamo through the premises to be lighted, and connect the lamps.

This having been done it only remains to start the engine, and the dynamo begins to pump electricity through the wires and lamps. This goes on as long as the generator runs. Of course a water-wheel, gas engine or Keeley motor, can be substituted for the steam engine and as a matter of fact many electric light plants are to-day driven by turbine wheels, though no startling successes are yet credited to the two last named motors.

In the abstract the dynamo machine is a cylindrical magnet wound backward and forward, from end to end with wire.

The whole makes a drum which is placed on bearings, at either end, and provided at one with a wheel which receives

the power from the engine. On either side of this drum, and partially encircling it, is an electro-magnet of great power. The combined arrangement suggests a small O between the arms of an inverted capital U. Now, let it be explained, after a dynamo is once started it always remains slightly magnetized. At any subsequent starting the machine rapidly charges itself and, in a few seconds, is working at its full efficiency.

The operation is this: The small residual charge in the field magnets- the legs of the U- act on the drum, or armature, magnetizing that and setting up a current of electricity in the wires wrapped around it. At the end of the drum opposite that to which the driving pulley is attached, is a copper cylinder called a commutator, on which rest two metallic, stationary brushes. These serve to sweep the current off as fast as it is generated in the armature, and, by means of leading wires, part is conveyed to the lamps, and part flows through the stationary magnets, keeping them in a complete state of magnetic saturation. By this principle of "mutual accumulation," as it is called, each part of the machine acts in turn upon the other and the result is the current which feeds the lamps. Such, in brief is the dynamo, and the principles herein stated are common to all machines.

Ohm.

MECHANICS HALL.
A Brilliantly Illustrated Lecture
on

ELECTRICITY!

And its Modern Practical Applications, will be
given at Mechanics Hall,
ON THURSDAY AND FRIDAY EVENINGS,
May 1 and 2, 1884, at 7.45 o'clock.

Under the auspices of the Worcester County Mechanics
Association and the Worcester Natural History
Society, favored by the presence and
supervision of

THOS. A. EDISON.

The Great Facts of the Electric Light, both
ARC AND INCANDESCENT,

Will be shown and demonstrated by the most competent
Electricians of the age, in a Programme
of wonderful richness and variety.

Ex-Mayor S. E. Hildreth, President of the Worcester
County Mechanics Association, and Dr. W. H. Raymenton, Pres-
ident of the Worcester Natural History Society, will pre-
side. The opening feature of the evening will be the ad-
dress of

SHERBURN B. EATON

Of New York, President of the Edison system of Incandescent
Electric Lighting, on "The Modern Advance of Electric Sci-
ence in its Useful Applications." Followed by the demon-
stration of interesting experiments by the eminent Electrician

PROF. E. H. JOHNSON

Of New York City, widely known as a popular lecturer throughout this country and Europe; who was in charge of the great International Electrical Exhibition at the Crystal Palace in London.

The PLATFORM and HALL will be decorated for the occasion by Messrs. Luther Steringer and H. F. A. Lange, Florist, of Worcester, who will introduce many beautiful effects with the Edison Incandescent Light, such as the Illuminated Garden, with Foliage and Flowering Plants, and the Illuminated Aquarium of Gold and Silver Fish; all of indescribable brilliancy and beauty.

The Marvels of Electrical Transmission will be illustrated by the MOTOPHONE, Loud-speaking or Chalk Telephone. In the course of the evening PROF. JOHNSON will introduce EDISON'S World Famous

PHONOGRAPH,

Which will repeat with marvellous accuracy Vocal, Elocutionary and Instrumental Effects so as to be heard in all parts of the hall.

THE ELECTRIC MOTOR will be shown and illustrated in its application to Manufacturing and Domestic purposes, the Turning Lathes, Sewing Machine, etc.

The Mechanical and Electrical Features of these lectures will be in charge of GEORGE B. RANOCROFT, of New York, practical Electrical Engineer.

Notwithstanding the great expense attending these lectures it has been the desire of the management to bring the price of admission as nearly as possible within the means of all our citizens. The price of tickets, with reserved seats, has been fixed at 50 and 25 cents.

Students' Tickets.

Students of the several Educational Institutions in the City and pupils of Grade IX, and of the High School will be presented with Free Tickets and reserved seat for Friday night's lecture by calling at their respective school rooms between the hours of eight and four P. M. Friday, or at the office of the Superintendent of Schools.

Tickets for Friday night can be purchased at the box-office Mechanics Hall, Wednesday afternoon and evening, and at Putnam, Davis & Co's on and after Thursday.

It is believed that the rare privilege afforded our citizens of seeing Edison, the greatest inventor of modern times, among the creations of his genius, will constitute one of the most marked and longest to be remembered features of this occasion.

The Hall will be open at 7 o'clock; lecture will commence at 7.45.

EVENING GAZETTE

Worcester, Mass.

Thursday Evening, May 1, 1884.

EDISON'S ELECTRICAL EXHIBIT.

Preparations to Illustrate the Lectures on Electricity.

The preparations for the exhibition of a great variety of electrical appliances in Mechanics Hall this and to-morrow evenings, under the auspices of the Mechanics' Association and the Natural History Society, are making rapid progress to-day, and promise the most instructive exhibition on this subject ever made.

The preparations include the placing in the basement of Mechanics Hall building of a horizontal engine from the manufactory of A. Burlingame of this city. The engine is built from entirely new patterns, handsome and symmetrical in design, combining great strength in all the parts where

it is needed. It has large bearings and both sides of the centre, balanced cranks do away with the one side strain and give a direct line of work and a very steady motion, which is especially desirable in electrical work. The managers of this exhibition consider themselves fortunate in being able to secure, right here in Worcester, such an engine. It has a speed of 320 revolutions per minute and is to be run during the exhibition under the personal direction of Mr. Burlingame.

Some further description of this engine may not be out

of place at this time. Oil is supplied to all its parts by automatic feed cups, so arranged that the oil can be renewed without stopping the engine, allowing continuous runs of any desired length of time. All the materials used in construction are of the highest standard, and perfection is aimed at in every particular. These engines are adapted to either a high or low speed, as may be required for the work they are to do. Engines of this pattern are already in use in several places giving entire satisfaction. The large printing establishment of Messrs. E. C. Stone & Co. is supplied with one of 25 Horse-power, which does its work very satisfactorily, with a saving in fuel over its predecessor, doing the same work. The new Gazette perfecting press is

run by one of these engines, and Mr. Bertell's sausage factory on Church Street is supplied by power with one of 15-horse-power. Mr. Burlingame is also making for heavy manufacturing his improved Corliss valved engine, which takes high rank; a new one of this pattern is now building for Albert Curtis of New Worcester. Mr. Burlingame's business has been constantly on the increase, and one year ago he found it necessary to move into his present location, No. 15 Cypress St., where the increased facilities have been taxed to their utmost ever since.

The large Edison Dynamo of the Worcester Corset Co., a 200-light machine, has been moved to the basement of the hall and connected with the above described engine, and this in turn has been connected with a switch board on the stage by which all the various lights can be controlled.

On the stage are a great variety of electrical fixtures, consisting in part of two set pieces of 21 lights each, several chandeliers, some floral pieces which combine incandescent lamps with natural flowers; brackets, portable lights and particularly a large floral lattice in brass with colored lamps. This lattice is a part of the exhibit at the great electrical exposition in Crystal Palace, London, and is shown here for the first time in this country. Every leaf and flower is in hammered brass and is an exact repre-

sentation of nature. On the stage also are the loud speaking telephone, the phonograph, automatic and hand regulators for controlling electric lamps; a sewing machine and turning lathe with electric motors attached; an arc light which will be controlled from the stage; an old gas chandelier from the Worcester City Hall, converted in about three hours time into an electrolier, showing how quickly old gas fixtures can be utilized for electric lighting. There are also specimens of the underground tubing and joints, a pyramid of flowers from Mr. Hermann F. A. Lange, interspersed with colored Edison Lamps.

These exhibits will be explained by Mr. E. H. Johnson of New York, MR. Luther B. Steringer, and a corps of the Edison Company's workmen. Major S. B. Eaton, President of the Edison Electric Light Company, will also address the audience, confining himself to the commercial aspect of the exhibit.

Mr. Edison and Major Eaton will arrive from New York at 5 o'clock this evening.

Yesterday after the close of the State Convention while the Edison workmen were waiting for the stage, the 10th District Convention, for which the west ante-room had been engaged, took possession of the stage and held it during the greater part of the afternoon, thus compelling the Edison people to work all night to get ready for to-night.

EVENING GAZETTE.

Worcester, Mass.

Friday Evening, May 2, 1884.

EDISON'S ELECTRICAL EXHIBIT.

Address by Major Eaton, and Explanations by Mr. Johnson.

The Edison electrical exhibition, in Mechanics Hall, last evening, opened successfully with an audience completely filling the Hall. President W. H. Raymenton of the Natural History Society and President S. E. Hildreth of the Mechanics' Association shared the duties of presiding.

Hon. Samuel E. Hildreth called the meeting to order and said that the gentlemen having the arrangements of the exhibition had selected the material for a thorough exposition of the subject of electricity. The great success of their efforts were in a measure due to the efforts of Dr. Raymenton. One of the influences which had led to the success was the securing the presence of the world renowned inventor, Thomas A. Edison. He had come on the sole condition that he should not be asked to speak from the platform. Mr. Edison, who occupied a seat beside the President, was received with hearty applause and smiled and bowed his acknowledgements.

Major S. B. Eaton of New York was then introduced and proceeded to discuss the subject of electric lighting from a commercial standpoint. First he spoke of the great amount of capital invested in artificial lighting. In London over \$60,000,000 is invested in gas; over \$40,000,000 in Paris; \$20,000,000 in the United States. In developing the system of incandescent lighting, Mr. Edison begins, with the coal, and ends where gas does, in the single light or chandelier. The speaker pointed out the various steps through which the coal is converted into gas and conducted into houses for lighting purposes, and then described Mr. Edison's system of incandescent lighting. The slowness with which his invention has come into use has been owing to the conservatism of the company which has had charge of this part of the enterprise. They ascertained that the business could be done at a profit in a city by extensive plant with the wires underground. It was next demonstrated that it could also be done in a scattered village by a plant at a New Jersey town of 80 houses when the wires are strung upon poles, instead of underground.

Among the advantages are cleanliness, and the fact that the light can be thrown just where it is needed. It is better for the eyes than gas, because its rays are nearly like those of daylight.

He described the business of furnishing light to consumers and measuring the current for power or light over metres adopted from a natural principle, and which are perfect in their work. The subject of incandescent lighting is all due the inventive genius and the shrewd business sense of Thos. A. Edison. His remarks were received with applause.

Dr. Raymenton then in a few words of explanation, introduced Mr. E. H. Johnson, who proceeded to explain the electric light from its discovery by Sir Humphrey Davy down to the present time. The first light was the arc light, similar to that now used in the Thompson-Houston system. These lamps have kept pace with the development of the dynamo, first invented by Faraday. The arc light now in use in Worcester, was explained, and one hanging in the wall was lighted.

He next entered upon the merits of Mr. Edison's inventions. He called attention to the great variety of uses to which electricity is put, the vast number of telegraphic lines to transmit messages, to sound burglar alarms, to call messenger boys and policemen, etc. This light is produced by heating to a white heat a loop of carbon in a globe from which the air has been exhausted to one millionth of an atmosphere.

He then explained at some length the development of the system, showing the underground tubes in which the wires are enclosed for the conveyance of the electric current to the houses where light or power is wanted. A lamp was broken to show that it would cause no damage. When broken the lamp was enclosed in Mr. Johnson's handkerchief, which was not in the slightest degree injured. He described the chandeliers and electroliers showing that costly gas fixtures can be utilized for the system of incandescent lighting. He showed the effect of overloading a wire with the electric current, and showed how absolute safety could be secured from danger from this source by a safety-plug, which will burn off and break the circuit before any damage will result to the wire.

Of the power of the light he said 16 candle-power was selected as the unit of light because that has been found to be the amount best adapted to the eye. Where more light is needed, to light large spaces or for decorative purposes, multiples of this candle-power are used. Lamps were shown of 16, 32, 64 and 100 candle-power.

The hand and automatic regulators by which the current of electricity in a factory or other large establishment can be controlled, were then explained, and their practical working demonstrated by the lamps on the stage.

The electrical meter, one of the most interesting and

delicate of all Mr. Edison's inventions, was fully explained. It consists of two plates of metal suspended in a solution, through which the electric current is passed, causing particles of metal to leave one plate and attach themselves to the other; and the amount of electricity that has passed over the wire is ascertained by weighing the plates and by mathematical calculations based on the loss of one and the gain of the other.

The Phonograph was then exhibited and its performances were received with hearty applause. The phonograph exhibited last night repeated conversation, two verses of "Mary had a little lamb," laughed, coughed, whistled, sang, and repeated a cornet solo. It was easily heard in all parts of the hall.

The speaking telephone was next shown. It differs from the ordinary telephone in the construction of the receiver, which has a diaphragm similar to that in the phonograph made of mica, and the vibrations are made audible by means of a chalk cylinder rotated by a crank. Its performances consisted of singing, speaking, whistling and a cornet solo. The electric motors did not work, because the time for preparation had been too short to properly connect and test them. But doubtless they will be in working order this evening, when all the interesting features of last night's

exhibition will be repeated.

After the lecture some 30 gentlemen were invited to meet Mr. Edison at the Bay State House, where an informal lunch was served, and an hour spent in social chat. Mr. Edison was the centre of an interested group at all times, and is evidently fond of explaining his inventions to appreciative listeners, though no conversationalist on general topics.

Speaking of the phonograph he said that he felt confident he could make it a commercial success if he could devote two years' study in perfecting it. The guests present at the table headed by Mayor Reed were:- Thos. A. Edison of New York, ex-Mayor Saml. E. Hildreth, Dr. W. H. Raymenton, Major S. B. Eaton of N. Y., E. H. Johnson of N. Y., Spencer Borden of Fall River, Hon. T. C. Bates, Stephen Salisbury, Jr., Frank P. Upton, ex-Mayor E. B. Stoddard, Dr. Homer T. Fuller, Samuel S. Green, A. P. Marble, J. Everts Greene, Milton P. Higgins, Mayor Chas. G. Reed, Samuel Winslow, P. W. Moen, Hon. Edw. L. Davis, Mr. Haywood, Henry A. Marsh, T. M. Rogers, Dr. Merrick Bemis, Henry M. Smith, Chas. B. Whiting, Geo. D. Bancroft, J. P. Munroe, Geo. Sumner, E. O. Parker, W. A. Smith, Luther Steringer, of New York, Geo. Stearns, Maj. L. G. White, John M. Bemis, C. D. Stickney of Fall River, Wm. E. Allen.

EVENING GAZETTE.

Friday Evening, May 2, 1884.

EDISON IN WORCESTER.

A Tour of the Factories and Other Institutions.

It was in accordance with the plan of the reception to Mr. Edison and his friends in Worcester, that they should visit some of the principal manufactories and educational institutions here, and this part of the programme was carried out to-day.

At 10 o'clock the reception committee assembled at the Bay State House, and an hour afterwards escorted their guests to carriages in waiting. The party included the following gentlemen: Messrs. Edison, Tomlinson, Steringer, Upton, Johnson, Russell and Hodginson of New York, Borden and Stickney of Fall River, and Mayor Reed, President Parker of the Common Council, ex-Mayor Hildreth, Supt. A. P. Marble, Dr. M. Bemis, Dr. Raymenton, Wm. Allen, Stephen Salisbury, Jr., Hon. T. C. Bates, Nathaniel Paine, Geo. D. Bancroft, and H. M. Smith of this city.

The first place visited was the Washburn & Moen manufactory on Grove St.

Entering the office the visitors were courteously re-

ceived by Mr. Charles F. Washburn, who immediately escorted them through the mill, covering nearly every department.

The first stop was made at the rolling mill, and both the old and new processes of drawing wire were inspected.

Much interest was manifested in the new or Belgian process, which is an important improvement over the old methods.

In this department the red hot rod is first taken from the furnace and is then drawn only once through continuous rollers, without having to return back and forth as by the old way. The rapidity of the drawing process and the perfect management of the heated wire by the workmen while transferring it from one roller to another was a fact pleasantly commented upon by Mr. Edison. The other departments visited was the barbed wire rooms, and it was explained that 80 miles of barbed wire per day was the average rate of manufacture. In the storage room there were piles of spools with barbed wire of various sizes, each spool containing 100 pounds, equal to 100 rods of barbed wire.

Passing from this department the party entered tempering rooms, and afterwards inspected the galvanizing and annealing departments. The passage through the factory was hasty, by reason of the short time permitted, but all the most important processes received attention.

Leaving the wire mill, the party were next driven to Messrs. S. R. Haywood & Co's boot and shoe manufactory on Winter Street and there crossed the street to Mr. J. H. and G. M. Walker's establishment. In the Haywood factory they were received by Mr. Haywood, who conducted them through all the rooms. Their attention was directed particularly to the Goodyear machine, a new and improved patent, in the bottoming department. The machine is in two parts, and sews both welt and out-sole, doing it as well, it is claimed, as by hand sewing, and turns out 150 pairs of boots or shoes per day. At Messrs. Walker's factory the greatest interest was manifested in the improved pegging machines, but all the rooms were visited, and the majority of the other processes inspected.

Leaving the Walker factory the gentlemen returned to the carriage and were driven to the Museum of Natural History on Foster St., where half an hour was pleasantly spent in examining specimens. The next institution visited was the Public Library, and there Mr. Edison seemed to take much interest in the surroundings. The party afterwards visited the Antiquarian Hall, Mr. E. W. Vaill's factory, the Normal School, Worcester Free Institute and the High School, following which they returned to the Bay State House.

THE DAILY TIMES.
Friday May 2, 1884.
EDISON'S EXHIBITION.

The Electric Machine, The Phonograph and the Telephone.

"The Wizard of Menlo Park," Thomas A. Edison, afforded the citizens of this city a rich treat last at Mechanics Hall, by an explanation and exhibition of his many inventions. The stage presented a beautiful appearance with the many colored lights and arrangement of Mr. Edison's wonderful inventions. There were electric lights in all sorts of arrangement and color; in chandeliers, singly, in masses of flowers, in an aquarium among lively fishes, in hand lamps and swinging lamps, and other devices for general convenience. Prior to the lecture, Mr. Edison was visited in the ante-room by leading citizens, and after the lecture he was entertained at the Bay State House by a large party of gentlemen. The Hon. Samuel E. Hildreth and Dr. W. H. Raymond, President of the Natural History Society, escorted Mr. Edison to the platform at 8 o'clock and introduced him to the audience, who applauded him very generously. Mr. Hildreth explained the purpose the societies had in view in bringing Mr. Edison; he said thanks were due to Hon. T. C. Bates, for the use of his dynamo, and

to Mr. Anson Burlingame of Cypress St. at whose shop the dynamo was being run to furnish a current for the experiments. Mr. Hildreth then introduced the lecturer.

Major Eaton of New York, spoke at length on the Edison system of lighting. He said an evening with Mr. Edison's inventions would be incomplete without the system of incandescent lighting. What is the Edison system, its history and its success? Mr. Edison in inventing his system has undertaken to complete a better system than formerly existed. He begins where gas does at the coal pile, and ends where it does in the light. Coal is used to create steam, which is carried to the engine, this in turn connected with the dynamo, from which the current passes as gas does, by mains to the houses, a meter being used as in gas.

Five years ago a body of scientists in London testified before a parliamentary committee that incandescent lighting was impossible. At the time Mr. Edison thought he had solved the problem, but he further experimented three years before giving it to the world. What is shown here now is no longer merely an exhibition. But he was restrained at first by the conservation of business men, who feared to start in competition with 300 millions put into gas. They began at length in New York, and for a year and a half worked for its introduction, and it has now been used for

20 months. Proved successful in a large city, it was tried in a small town with but 80 houses. Here the wires were put overhead, those in New York being underground, and here, too, the plan was successful. Now 13 companies have been started all engaged in the same business as the New York company—that of forming an electric current and selling it to consumers over a wire. The superiority over gas consists in its cleanliness; it does not vitiate the air nor injure paintings nor gilding. It is better adapted to the human eye, having much the same rays as daylight. The light is also adapted for use in specific places. The meter can be relied upon for accuracy, being founded on a law of nature, and not on a device of man. The current can also be used for power from small machines to large industries. Mr. Edison ran his establishment at Menlo Park for some time with electricity. Another Edison industry is isolated lighting, which bears the same relation to general companies that one lamp does to the city plant.

There are now 310 of these isolated plants with some 60,000 lamps. In New York there are 509 consumers with some 11,000 lamps. The current is regulated by the number of engines at work in the central station. Dr. Raymenton then introduced Mr. E. H. Johnson of New York, the confidential assistant of Mr. Edison. He said that his 14 years of association with Mr. Edison has shown him the latter liked of all

not to be talked about, so he would confine his attention entirely to what the inventor had done. The electric light was briefly sketched. It began with Sir Humphrey Davy, but languished for the lack of strong current until Faraday invented the dynamo machine. The arc light has kept pace with the improvement of this machine. It is practically two pencils of carbon, held slightly separated by mechanical means. The principal is that a current passing through jumps the separating interval, carrying particles of carbon with it and forming a voltaic incandescent arc. The production of a small light for household use was the problem Mr. Edison solved. The speaker turned aside to enumerate the uses of electricity, noting especially the increase in its use as a domestic agent, and pointing the convenience of having a current brought to the house and measured out rather than having a battery, which would be a source of trouble in the house.

A centre piece of gilt filagree at the back of the stage was here lighted up by a number of incandescent lights, with colored globes hung before it. The light was explained as a filament of carbon heated to incandescence in a vacuum. The pipes, with their copper wire, and the conductors were shown and explained, and the convenience in lighting and turning off shown. It was shown how a light could be

turned down by forming a bridge to the current by two lamps; next a steamship lantern, with wires to allow of using in small confined places. The lamps will all wear out by the separation of the carbon. This requires from 1000 to 2000 hours. A night lamp with two burners arranged in an electric magnet, with an armature, was shown, that would burn continually, one igniting the other if itself worn out. The lecturer showed the freedom from danger by accident to the lamp by binding his handkerchief over one and then breaking the glass. Lamps in the middle of cut flowers were lighted to show the absence of heat. Two chandeliers of 20 lights were also lighted, a portion at a time, to show the convenience of handling. The lecturer explained how arrangements of the current could be made so that burglars effecting an entrance would light the whole house. An electrolter, a combination of gas and electric light chandeliers was exhibited, and the possibility of transforming the ordinary gas chandelier into an electric light chandelier shown. The lecturer next showed the danger of the science by currents too strong for a wire, by the experiment of burning a wire. The preventive of accident by the lead safety plug was also explained. Lamps of 16, 32, 50, and 100 candle power were then exhibited, and the means of controlling the current both by hand and automatic regulators.

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Having thus run over the light in various forms, he turned to the meter which records the amount of electricity consumed. It consists of two plates of metal in a bottle solution, the current causing an interchange of metal and consequence change in weight. This change of weight gives a means of measurement of the current. The various applications of the current as a motor could not be illustrated because of lack of time to make preparations. The movable lamp and cigar lighter were lastly exhibited. The phonograph was the next invention to be described. Its principle is tracing on a barrel of tin foil by a needle point itself attached to a diaphragm. The vibrations of a human voice are graphically represented by the indentations of the needle. The foil is wound on a cylinder, which is kept in motion. Reversing its motion causes the needle to retrace its course and return the vibrations to the diaphragm, which in turn transmits them to the air.

The exhibitor then gave exhibitions of the instrument in talking, laughing, whistling, singing and playing on the cornet. The telephone followed. Mr. Edison's contribution to the general system being the carbon transmitter.

His own peculiar system, however, is the speaking telephone, which is used to a certain extent in England, but not much in America. Its working resembles that of the

phonograph in that a motion of a cylinder is required.

The cylinder is of chalk, the current carrying the vibrations of the voice working upon it, and tending to overcome the friction of the cylinder against the diaphragm of the receiver. The exhibitor talked with an assistant stationed in the basement the latter's voice being distinctly heard all over the hall, as was also the cornet played in the basement. This concluded the exhibition. To-night, in its repetition it is intended to have the arrangement of the stage entirely changed, and all the motors, etc., for which time for arrangement was lacking, in complete working order. To-day the visiting electricians are guests of the committee who will take them on a tour of observation about the city. They will visit the Free Institute, various shops and points of interest.

WORCESTER DAILY SPY.

Friday, May 2, 1894.

THE ELECTRICAL EXHIBITION.

Edison's Inventions--The Electric Light,
The Phonograph and the Telephone.

Mechanics Hall was filled to its utmost capacity last evening, on the occasion of the grand electrical exhibition, and the audience for two hours was treated to explanation and illustration of the devices created by the wizard of Menlo Park. The stage was filled with his various inventions--electric lights in all sorts of arrangement and color; in chandeliers, singly, in masses of flowers, in an aquarium among lively fishes, in hand lamps and swinging lamps, and other devices for general convenience. The inventor himself, Mr. Thos. A. Edison, received an impromptu reception in the ante-room, and then appeared upon the stage shortly before 8 o'clock, escorted by Hon. Samuel E. Hildreth and Dr. W. H. Raymenton. His appearance was a signal for prolonged applause. Mr. Hildreth in a brief speech explained the motive of securing the attendance of the noted electrician, and said much of the credit was due to the indefatigable president of the Natural History Society.

Thanks were also due to Hon. T. C. Bates for the use of his dynamo, and to Mr. Abraham Burlingame, at whose shop on Cypress St., the dynamo was being run to furnish a current for the experiments. He then introduced Major Eaton of New York, who spoke at length on the Edison system of lighting.

What is the Edison system, its history and its success? Mr. Edison in inventing his system has undertaken to complete a better system than formerly existed. He begins where gas does at the coal pile, and ends where it does in the light.

Coal is used to create steam, which is carried to the engine, this in turn connected with the dynamo, from which the current passes as gas does, by mains, to the houses, a meter being used as in gas. Five years ago a body of scientists in London testified before a parliamentary committee that incandescent lighting was impossible. At that time Mr. Edison thought he had solved the problem, but he further experimented three years before giving it to the world.

What is shown here now is no longer merely an exhibition. But he was restrained at first by the conservatism of business men, who feared to start in competition with 500 millions put into gas. They began at length in New York, and for a year and a half worked for its introduction, and it has now been used for 20 months. Proved successful in a large city, it was tried in a small town with but 80 houses. Here the wires

were put overhead, those in New York being underground, and here, too, the plan was successful. Now 13 companies have been started, all engaged in the same business as the New York company--that of forming an electric current and selling it to consumers over a wire. The superiority over gas consists in its cleanliness; it does not vitiate the air nor injure paintings or gilding. It is better adapted to the human eye, having much the same rays as daylight.

The light is also adapted for use in specific places. The meter can be relied upon for accuracy, being founded on a law of nature, and not on a device of man. The current can also be used for power for from small machines to large industries. Mr. Edison ran his establishment at Menlo Park for some time with electricity.

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ed about, so he would confine his attention entirely to what the inventor had done. The electric light was briefly sketched. It began with Sir Humphrey Davy, but languished for the lack of strong current until Faraday invented the dynamo machine. The arc light has kept pace with the improvement of this machine. It is practically two pencils of carbon, held slightly separated by mechanical means. The principle is that a current passing through jumps the separating interval, carrying particles of carbon with it and forming a voltaic incandescent arc. The production of a small light for household use was the problem Mr. Edison solved. The speaker turned aside to enumerate the uses of electricity, noting especially the increase in its use as a domestic agent, and pointing out the convenience of having a current brought to the house and measured out rather than having a battery, which would be a source of trouble in the house. A centre piece of gilt filagree at the back of the stage was here lighted up by a number of incandescent lights, with colored globes hung before it. The light was explained as a filament of carbon heated to incandescence in a vacuum. The pipes, with their copper wire, and the conductors were shown and explained, and the convenience in lighting and turning off shown. It was shown how a light could be turned down by forming a bridge to the current by two lamps; next a steamship lantern, with wires to allow of using in small

confined places. The lamps will all wear out by the separation of the carbon. This requires from 1000 to 2000 hours. A night lamp with two burners arranged in an electro magnet, with an armature, was shown, that would burn continually, one igniting the other if itself worn out.

The lecturer showed the freedom from danger by accident to the lamp by binding his handkerchief over one and then breaking the glass. Lamps in the middle of cut flowers were lighted to show the absence of heat. Two chandeliers of 20 lights were also lighted, a portion at a time, to show the convenience of handling. The lecturer explained how arrangements of the current could be made so that burglars effecting an entrance would light the whole house.

An electrolier, a combination of gas and electric light chandeliers, was exhibited, and the possibility of transforming the ordinary gas chandelier into an electric light chandelier shown. The lecturer next showed the danger of the science by currents too strong for a wire, by the experiment of burning a wire. The preventive of accident by the lead safety plug was also explained. Lamps of 16, 32, 50 and 100 candle-power were then exhibited, and the means of controlling the current both by hand and automatic regulators. Having thus run over the light in its va-

rious forms, he turned to the meter which records the amount of electricity consumed. It consists of two plates of metal in a bottle in solution, the current causing an interchange of metal and consequence change in weight.

This change of weight gives a means of measurement of the current. The various applications of the current as a motor could not be illustrated because of lack of time to make preparations. The movable lamp and cigar lighter were lastly exhibited. The phonograph was the next invention to be described. Its principle is tracing on a barrel of tin foil by a needle point itself attached to a diaphragm.

The vibrations of a human voice are graphically represented by the indentations of the needle. The foil is wound on a cylinder, which is kept in motion. Reversing its motion causes the needle to retrace its course and return the vibrations to the diaphragm, which in turn transmits them to the air.

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His own peculiar system, however, is the speaking telephone, which is used to a certain extent in England, but not

much in America. Its working resembles that of the phonograph in that a motion of a cylinder is required. The cylinder is of chalk, the current carrying the vibrations of the voice working upon it, and tending to overcome the friction of the cylinder against the diaphragm of the receiver. The friction is overcome in waves of sound which the diaphragm reproduces. The exhibitor talked with an assistant stationed in the basement, the latter's voice being distinctly heard all over the hall, as was also the cornet played in the basement. This concluded the exhibition.

To-night on its repetition it is intended to have the arrangement of the stage entirely changed, and all the motors, etc., for which time for arrangement was lacking, in complete working order. To-day the visiting electricians are guests of the committee, who will take them on a tour of observation about the city, with visits to the Free Institute, various shops and points of interest.

On the conclusion of the exercises at the hall last evening, Mr. Edison held another informal reception at the Bay State House. An excellent supper was served, some 30 gentlemen sitting down to the table. Each guest was presented with an Edison 16 candle incandescent lamp as a souvenir of the occasion. There were no speeches, the evening closing with informal conversation.

NEW ENGLAND HOME JOURNAL.
Worcester, Mass., May 3, 1894.
THE EDISON EXHIBITION.

Mechanics Hall was crowded to its utmost on Thursday evening, to witness the electrical exhibition of Mr. Edison's inventions. The stage was filled with various electrical devices. There were electric lights in all colors and all sorts of arrangements. Chandeliers were hidden among great piles of flowers, while various hand and swinging lamps were lighted in the course of the explanations. Mr. Edison was loudly applauded when under the escort of ex-Mayor Hildreth and Dr. W. H. Raymenton, he appeared upon the platform.

Mr. Hildreth after a brief speech explaining the origin of the movement to secure Mr. Edison, introduced Major Eaton of New York, who gave an account of the Edison system of lighting, its history, its development, and its success, which held closely the interest of the great audience.

Dr. Raymenton then introduced Mr. E. H. Johnson of New York who has long been Mr. Edison's confidential assistant. After a brief explanation of the History of electricity, and Mr Edison's contributions to the science, he proceeded to give various experiments of Mr. Edison's inventions. He showed

how the incandescent system of lighting (Mr. Edison's) can be used successfully for domestic purposes, after much the same manner as gas. Electric lights were placed among a pile of flowers to show that there was no heat nor noxious odors, the flowers remaining fresh and unharmed.

It was shown also how the danger from electric lights could be successfully averted, rendering them perfectly harmless, and the lecturer explained how electricity could be measured by meters with absolute accuracy.

The exhibition of the phonograph was loudly applauded by the audience, as it gave back the talking, singing, whistling and laughing tones of the speaker. The exhibition closed with explanation and exhibition of the Edison telephone.

At the conclusion of the exhibition, Mr. Edison held an informal reception at the Bay State House. Supper was served at which some 30 gentlemen sat down. Each gentleman was presented with a 16 candle Edison lamp as a souvenir of the occasion. Under the escort of a local committee the party of Mr. Edison made a tour of principal points of interest in the city, including Antiquarian Hall and the Public Library.

WORCESTER DAILY SPY.

Saturday, May 3, 1884.

THE ELECTRICAL EXHIBITION.

An Illustration of Electricity and its Many Uses.

The exhibition of the incandescent electric light and the other inventions of Edison was successfully repeated in Mechanics Hall last evening, and several features omitted Thursday were included in the display. As before, Hon. Samuel E. Hildreth presented Major S. B. Eaton of New York, the president of the Edison company, but the latter excused himself from extended remarks to give further time for the experiments. He, however, briefly sketched the history of the Edison light, and said the inventor possessed 300 patents on his inventions in the United States alone.

Mr. E. H. Johnson again explained the various devices of the great electrician. One incident which he related, afforded considerable amusement. When the announcement was publicly made that Mr. Edison had solved the problem of interior illumination by means of the incandescent system, the scientific journals and magazines were flooded with articles to prove it impossible.

These, Mr. Johnson said, it was the custom of Mr. Edison and his assistants to read by the light of the new incandescent light. The lecturer explained the manufacture of the light more at length. The carbon filament is a strip of bamboo six inches long, eight one thousandths of an inch wide. The chief additions to the entertainment were the electric motors in operation. The motor was described as a miniature dynamo driven by electricity instead of by some other external force and transmitting its motion to some machine. The first exhibition of one was in connection with a floral pyramid of flowers, prettily arranged by Mr. Hermann F. A. Lange which was made to revolve by a small motor. Electric lights were interspersed among the flowers. A sewing machine and a lathe were also run by motors, the latter by one rated at one fifth of a horsepower. It was stated that the cost of running a sewing machine continually for one day was one and one fourth cents presumably at the rates established under the New York plant.

To show the facility of change from gas to electric light fixtures, a gas chandelier taken from the city hall was shown lighted with Edison lamps, the changes it was stated having been made in a few hours. In connection with the light placed in the aquarium, it was stated that from

the United States fish commission ship Albatross, an Edison lamp had been sunk 1000 fathoms, and endured the pressure.

The arrangement of the underground conductors was also more fully explained. The three copper wires are inserted in an iron tube, and held apart by rubber washers slipped over them. Then the tube is filled with insulating material, which hardens, making a compact mass of the whole.

Other novelties were a miniature lamp of one candle-power for use by dentists in illuminating a patient's mouth, which was compared with a large light of 150 candle-power.

Two electric clocks, manufactured by J. P. Kettell of this city, were shown, one supposed to be the standard controlling the other, and regulating its movements each hour. There was a large audience present. Several hundred tickets were distributed among scholars in the High School, grade 9, the Free Institute and the Normal School.

After the hall was cleared several photographs of the stage were taken by W. H. Fitton under the electric lights.

EVENING GAZETTE.

Worcester, Mass.

Saturday Evening, May 3, 1884.

INCANDESCENT LIGHT.

The Second Edison Exhibition in Mechanics Hall.

The numbers present at Mechanics Hall, last evening, at the Edison electrical exhibition was nearly as large as the night before. All the details of the exhibition were in perfect order, and worked to a charm.

Ex-Mayor Hildreth, in calling the company to order, made reference to the more complete preparations, which were impossible the night before, as they could not have the hall in time. In closing he introduced Major S. B. Eaton of New York, President of the Edison Company.

He explained in some detail the Edison system and its commercial aspects, substantially as reported. He spoke very complimentary of the industries of the city, and expressed surprise that they were so varied.

Dr. Raymenton presented Mr. Edison and then introduced his confidential associate, Mr. E. H. Johnson, who explained the incandescent system of lighting at considerable length. He began with reference to the making of the steam,

then referred to the power, and the dynamo where the electricity is generated. All this has been furnished the readers of the Gazette from time to time. Much of the lecture was the same as the first and reported yesterday. The appliances for light, heat and power were all in active operation at one time on the platform, and all furnished by one and the same current, which was under the direct control at all times of the speaker.

The new features of last night's exhibition were the electrical motor and the electric clock. An electric motor is a miniature dynamo, the working of which is the reverse of the dynamo, which generates the current at the central station. Then the current is generated by the dynamo and passes to the service wires by the brushes, not so with the motor; there the wire of the circuit carries the electricity to the brushes which bear on the commutator, and so a current of electricity flows through the wires, a part going through the armature and another part through the magnet and by the mutual separation between the field magnets and the armature, the current passing through produces the motion on the shaft and pulley connected with the dynamo, and the motion is carried to the machine by a small belt.

The floral pyramid, some six feet in diameter, was rearranged last night by Mr. Hermann F. A. Lange.

Without the light, it was a fine exhibit. This was made to revolve by a motor underneath the table. There were attached to the table six circuits of wires, each of which was opened and closed during one revolution.

The lamps were of various colors, and the effect of the changing of lights was beautiful. The sewing machine was next started; the lady operator who had not seen the attachments until she went upon the platform, was able to handle and control it with ease. Mr. Edison stated that the expense of operating the motor was one and a quarter cents per day. The turning lathe was started with a motor of one fifth of a horse power. The last new experiment was the clock regulator, the work of Mr. J. P. Kettell of this city. The clocks were placed on each side of the hall; one was set at standard time and as the minute hand arrives at the hour all the clocks connected with it are set to correspond. It is particularly designed for lines of railroad and large establishments. Mr. Kettell has on one line, which is working successfully, 28 clocks, on a stretch of wire 98 miles in length. After the exhibition Mr. W. H. Pitton photographed the stage as a whole, and also the several pieces exhibited. Messrs. Edison, Tomlinson, Upton and Russell left this city for New York on the

midnight train last night. The rest of the party will remain in Worcester until this evening.

WORCESTER DAILY SPY.

Supplement.

Wednesday, May 7, 1884.

EDISON IN WORCESTER.

Some Notes of the Recent Electrical Exhibition.

The Edison party left Worcester for New York by the midnight train on Friday after the second evening at Mechanics Hall. They expressed themselves greatly delighted with their reception and entertainment in this city, and at the success of the novel and charming exhibition in which they had borne part. Our citizens have the right to the solid satisfaction of knowing that no occasion of the kind ever took place in this or any other country where the modern advance of electric science in practical applications has been so fully and beautifully illustrated as at Mechanics Hall on the two evenings of last week.

Dr. W. H. Raymenton, President of the Worcester Natural History Society, stands responsible for the inception and

the carrying out of the whole affair, and from him has been obtained some of the facts and incidents of the undertaking. His indefatigable efforts in this and other kindred objects have made his methods pretty well known to our citizens, so much so, indeed, that when it is understood that he has got his forces well at work, our public speedily look for the results sure to arrive. In the practical application of electricity or any other science to the affairs of life, the methods of reaching the public with the information they seek are hampered not a little by the fact that the subject has become a business matter, and somebody will be benefitted by the discussion. Especially is this true of the new adaptations of electricity. Who shall best tell of its progress if not those most interested in its advance? But this will be "advertising."

Dr. Raymenton looked these considerations squarely in the face, and then, as furnishing the best sources of the information he asked in behalf of his Natural History Society, he resolved to go at once to the fountains of such information. Some months ago he began the correspondence with leading authorities in the various fields of electric lighting and the electric motor, inviting them to unite in an entertainment of a purely scientific character, and edu-

cational in its purposes, leaving them to find their own subsequent advantage in the presentment. As the project grew, its very bulk and its broadening into the field of the mechanic arts caused the co-operation of the Worcester County Mechanics Association, and from that time the work went forward apace.

The inside working of such an undertaking is always entertaining. Dr. Raymenton gives a graphic account of the first visit of the Worcester party to Mr. Edison's office to enlist him in the project. He at first utterly refused. He was too busy to be butchered for anybody's holiday; never spoke in public; would not be made a show of. But when it was shown that two societies were co-operating in the matter and were pledged to their members for the character of the entertainment, Mr. Edison consented to come to Worcester, and from that time throughout was one of the most earnest and active of helpers for the success of the affair.

Now when it is understood that the recent electrical entertainment carries forward the policy of our Natural History Society as established and for several years pursued by its President, the explanation not only leaves nothing uncertain as to past entertainments, but it gives a promise for future undertakings in the announced direc-

tion of seeking the fullest and clearest information as to the application of scientific knowledge to the affairs of life. When the telephone was first introduced in Worcester, the manager of the local company gave a very able exposition of the new instrument, followed a few weeks later by an admirable illustrated lecture by Charles A. Chase, giving the public the information that was timely and desired. The horse lecture by John E. Russell is also in point.

That these all are but the beginning of what is to be, seems to be fully assured by the spirit of the two associations, whose achievement of last week created two of the most remarkable occasions ever given in Mechanics Hall. Ex-Mayor Hildreth, President of the Mechanics Association, co-operated throughout the matter, was one of the first visiting party to New York, and was closely connected with the arrangements that brought this success.

Asking Dr. Raymenton what next the public may look for, his answer was; "During the past five years that I have been President of the Natural History Society it has been my aim to give the people of Worcester and our lecture audiences and classes the best and latest information of the day on any subject coming within the domain of natural science. Our work in our popular classes, lectures, field-

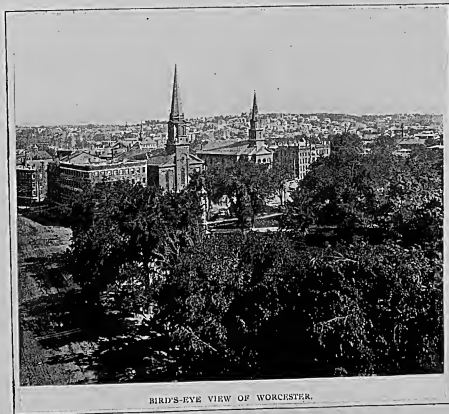
meetings, museum work, etc., has been, like that of our public library, unique and original, and we have covered a wide range of subjects. "What next?" "Well, we shall see."

NEW ENGLAND HOME JOURNAL.

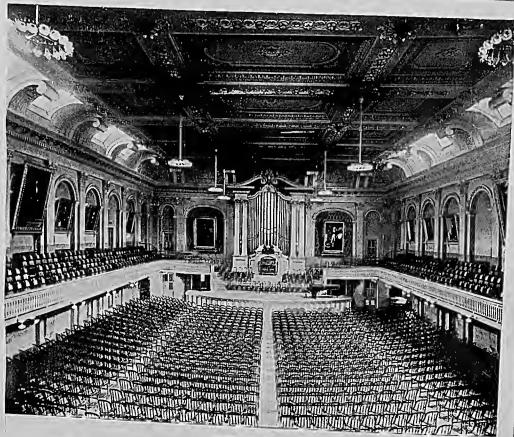
Worcester, Mass., May 10, 1884.

Curious, wasn't it? That while the great audience at Mechanics Hall on Friday evening were studying the electric light, that same light of the arc pattern was busying itself in setting fire to Louis Friendly's store. The loss was not large and we are waiting to hear some wise-acre declare it an "advertising dodge" of the incandescent people. The fact is that all points of caution must be observed or the electric light is a dangerous fire bug.

The city took in its fill of electric lighting, in the two great occasions at Mechanics Hall, last week, whereby several thousand people young and old were easily helped to know more of Edison and his light than they could have learned in any other way. A company is following hard upon the heels of the Edison entertainments, to reduce the problem to practice in the lighting of Worcester homes, and this will be a further benefit if oil and gas are superseded by the beautiful illuminator.



BIRD'S-EYE VIEW OF WORCESTER.

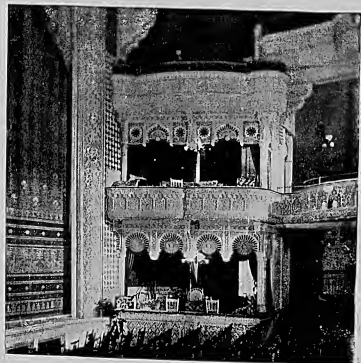


MECHANICS HALL.

Dimensions.—Length, 130 ft.; width, 90 ft.; height, 48 ft. Seating capacity of floor, 1272; galleries, 718.



CLARK'S BLOCK, MAIN STREET.



INTERIOR WORCESTER THEATER.



WORCESTER POLYTECHNIC INSTITUTE.



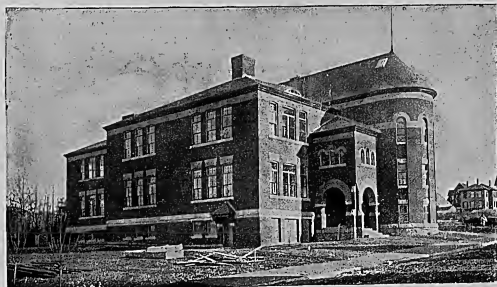
CLARK UNIVERSITY.



A TRIO OF MAIN STREET RESIDENCES.



Graton & Knight Mill Co., Worcester, Mass.



DOWNING STREET GRAMMAR SCHOOL.



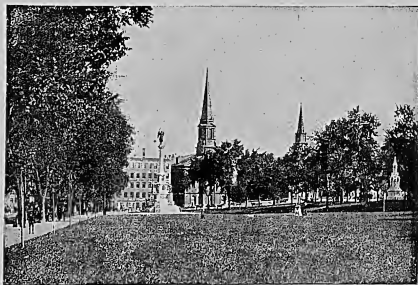
HERBERT HALL



MEMORIAL HOSPITAL



WORCESTER INSANE ASYLUM, REAR VIEW.



PARADE GROUND (Old Common).



FRANKLIN SQUARE.



Worcester Society of Antiquity.



Y. W. C. A. Building.



Worcester Bank Building.



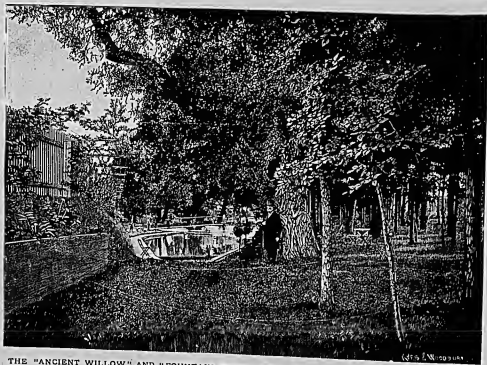
Dodge Pavilion, Natural History Camp.



Natural History Society.

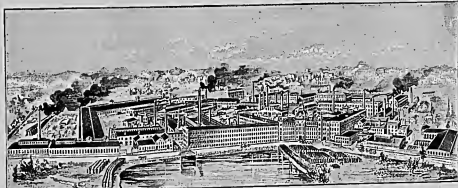


WASHINGTON CLUB HOUSE, LAKE QUINSIGAMOND.

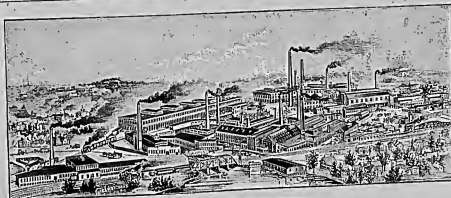


THE "ANCIENT WILLOW" AND "FOUNTAIN SPRING," WILLOW PARK, THOS. H. DODGE'S GROUNDS.

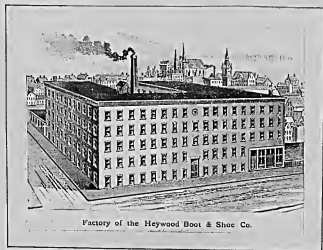
Washburn & Moen Mfg Company.



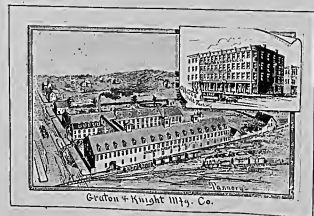
NORTH WORKS—GROVE STREET, WORCESTER.



SOUTH WORKS—QUINSIGAMOND.



Factory of the Heywood Boot & Shoe Co.



Groton & Knight Mfg. Co.



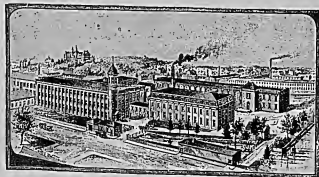
FACTORY OF THE WM. H. BURNS COMPANY.



FACTORY OF FOREHAND ARMS COMPANY and REED & PRINCE



M. J. WHITTALL'S CARPET MILLS.



Worcester Carpet Company's Mills.



CROMPTON LOOM WORKS, GREEN STREET FRONT.



Sunday Spy, May 17, 1896.

WIZARD EDISON.

Worcester Men Visit Him at His Laboratory.

MAY 13, 1896.

ELECTRICAL EXPOSITION.

Some of the sights at the New York show.

Progress of the Work on the new Macomber Chemicalizer
at La France Works.

Dr. W. H. Raymenton and Clarence R. Macomber have just returned from a week's trip to Elmira, N. Y., relative to the final work on the Macomber Chemicalizer, the new fire fighting machine, now being built for them by the La France Fire Engine Company.

They found the machine nearly completed, and all that remains to be done is the putting on of the gun metal and copper ornamentations, colored glass side lights and lanterns, metal blanket case, gold eagle, rotary gong, name plates etc.

The iron parts of the frame work are to be painted in white and gold, and the running gear a rich carmine. These colors in combination with the highly polished metal parts, will make a very beautiful effect.

The machine will be furnished with a three horse hitch,

and the team will be completed with three coal black horses, with gold mounted harness, having white and gold collars.

Dr. Raymenton and Mr. Macomber, are enthusiastic about the machine, and declare that the La France people are building for them the handsomest piece of fire apparatus ever turned out of any works. They also assert that the entire outfit will be the most showy and elegant fire department hitch in the world.

Capt. Wm. Falck, the treasurer of La France works, has just returned from New York and Brooklyn. He stated that Mayor Wurster, Fire Commissioner Bryant, and the Fire Chief of Brooklyn, and also Chief Bonner of New York were all much interested in the Macomber Machine, and promised him to do all in their power to give it a good test in their cities.

On the return trip home Raymenton and Macomber visited the Electrical Exposition in New York, and also had the pleasure of an hour's interview with Thomas A. Edison at his laboratory in Orange N. J. Speaking of this visit, Dr. Raymenton said:

"Taking an early morning ferry boat for Hoboken, and from there by train, an hour's run brought us to Orange, N. J. the home of Mr. Edison. After ten minutes ride on electric we found ourselves at the gateway of Edison's laboratories.

This was locked, but a press on an electric button brought

a watchman, who admitted us to the grounds. Being ushered into Edison's library, and producing cards we were left by ourselves.

After a few moments the card bearer returned, saying Mr. Edison would see us in half an hour, and then left us alone to roam about among Edison's books and treasures.

This opportunity allowed us to take a good mental photograph of Edison's den (if a well appointed scientific library can be called such.)

This room is finished in natural wood of a hard variety and has two galleries running entirely around it. At one end is an immense mantle and fire-place, having gas logs as large as grandfather's cord wood. Over the mantle is a large clock, face of carved wood, and the hands coming from a large carved sun burst. On the mantle is a statuette of Sandow, and beside it is a bust of Humboldt, indicative of physical and mental strength and superiority. Then there is a large mounted American eagle and under the eagle an owl, symbolical of power and wisdom.

About the room on tables are phonographs in different stages of development. In the center on a pedestal is a life size figure in marble called "Italie"- a graceful, boyish figure, having wings and holding in his hand high above his head, a large Edison incandescent lamp.

On the walls are portraits of renowned scientists such as Watts, Bunsen, Magnus, Hirschhoff and Liebig. Also two fine views of Edison's beautiful home, Elmermont in Llewellyn Park, Orange, N. J. In a small frame is the following: "The surrounding outfit of library conveniences are presented on the forty-second anniversary of his birth-day, to Mr. Thomas A. Edison by all the present and a few of the past workers in his laboratory. Orange, N. J., February 11th, 1889."

This makes Mr. Edison's age at the present time, forty-nine years. We found a last year's Edison straw hat on one of the shelves and it being about our size, $7\frac{3}{8}$, we took pleasure in trying it on and had our pockets been a little larger we might have brought it away as a souvenir.

Mr. Edison's employees have the free use of his library; the use being governed by a few simple rules. Mr. Edison's "half hour" contains just one hundred and twenty minutes, and at the end of that time he came and greeted us with a happy smile and a cordial handshake. He had not forgotten his visit to Worcester in 1884, and spoke of the good time he had when here at the electrical exposition given in Mechanics Hall by the Natural History Society and the Mechanics' Association.

He has grown gray since that time, his hair being thick and quite long, of a silvery shade, each hair standing up as if electrified. His face, however, is still youthful, almost

boyish, with a healthy color, and his gray eyes are as bright and penetrating as ever.

He was dressed for work, had on a faded pink shirt of the negligee order, with collar secured by a narrow black tie, no buttons in the cuffs, and a black cutaway coat over it, giving the impression that he had just rolled down his shirt-sleeves and slipped on a coat before presenting himself.

His hands showed that he works with them as well as with his brain, being slightly begrimed, yet these same hands were slender and delicate with taper fingers, and almost showing the intellectual gray matter in the tips of them.

Drawing up a chair he seated himself directly in front of us and gazed at us with an expectant, intense expression on his face, saying without words, "well, what can I do for you?"

We told him our object in coming to him was our desire to learn if he had ever paid any attention to the subject of extinguishing fires by chemical processes. We then told him of our work and explained the principle of the Macomber Chemicalizer and the action of the chemicalized stream of water when coming in contact with the flames. He told us that the matter of fire extinguishment was out of his line, but that he was "a kind of a chemist," and it was remarkable to see the way he grasped the subject and his manner of handling it.

He agreed that water was a mighty poor fire extinguisher and said that it was absolutely necessary to completely drown a fire by the use of water; and he further agreed with us by saying "water thrown on the hot coals of a fire and on the superheated iron work of burning buildings, actually adds fuel to the flames by being instantly decomposed and at once turned into highly inflammable gases."

"But," said Mr. Edison, "I believe you have solved the problem in a right and scientific manner. You put into the full sized fire hose large quantities of chemicals, which coming in contact with fire, liberates large volumes of fire-killing gases, and you also get large amounts of enameling vapors which must completely coat over all parts of a burning structure. It looks to me a great advancement of present methods of fighting fire. You do it on a large scale, and I have no doubt of its success."

It is an inspiration to talk with such a man, and while he listens like one to whom is being imparted new truth and knowledge, you feel at once that he has anticipated what you were to say; and when he gives an opinion, that it is a safe and masterful one. After about an hour's talk he suddenly arose and saying, "Well, gentlemen, I must go to work," he bid us good day, and as he left the library and entered the stockroom, where one can see almost everything necessary for scientific research, we heard his pleasant voice saying to an as-

sistant, "Tommy, have we any bichromate of potash on hand?" showing that his mind was instantly again on his experiments.

While waiting for Mr. Edison, a lady drove into the laboratory grounds, seated in an open carriage, drawn by a fancy matched pair of beautiful horses, with a driver in livery.

It proved to be Mrs. Edison, a young looking woman of pronounced brunet type with a handsome and pleasing face.

She had brought Mr. Edison's luncheon, and we were told that when busy with his experimental work he would stay for days at a time at the laboratory and never once think of leaving it. He is now intensely absorbed with X-rays work.

We left Mr. Edison feeling that we had indeed been privileged in being able to enjoy the company, and breathe the atmosphere of the greatest scientific intellect of the century.

Returning to New York we visited the Grand Electrical Exposition being held in Grand Central Palace near 42nd street on Lexington Avenue. This is under the management of Frank W. Hawley, the vice President of the Cataract Electric Power Company of Niagara Falls, who received us very kindly and paid us marked attention, showing us about the exposition building and explaining many things of interest. This exhibit is well worth visiting.

There is shown a model of the big electric power plant at Niagara Falls, 460 miles away, over an ordinary telegraph wire. By means of a telephone one can distinctly hear the roar of Niagara, transmitted over the same wire.

Then there is a model of a canal boat drawn by an electric motor, running on a trolley wire, and pulling the boat through the water. Mr. Hawley told us that they were already operating twelve miles by this method, and that the canal-boat horse and driver had "got to go."

Another interesting feature is the sun-light room; a darkened room that is lighted by electricity in tubes about the room and giving the effect of sun-light. The operator stated that very soon all houses and stores would be lighted with this electric sun-light.

In another part of the building can be seen the Roentgen X-rays and everybody visiting the exhibition can have the pleasure of viewing his own bones without extra charge. After gaining admission, the price of which is half a dollar, everything is free. Mr. Hawley took us down in the basement and introduced us to the woman engineer or engineeress. This is a type of the new woman we had not before met. We were also shown the signature to the telegram to be sent around the world on Saturday evening, May 16th, by Chauncey M. Depew, at the exposition.

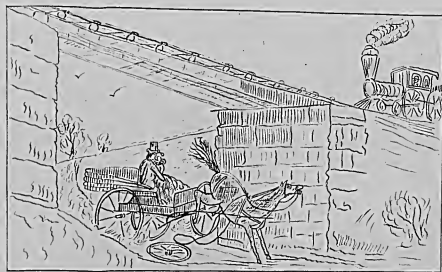
It is to be sent from one end of a cable, travel over the wires sixty-eight thousand miles, and will be received in forty minutes at the other end of the cable by Thomas A. Edison, who has kindly promised Mr. Hawley to be present and receive the message from the sounder.

This message while travelling, will be taken off at 12 different telegraph offices in as many different parts of the world, and published in the next morning's daily papers, in as many different languages. Mr. Hawley also had Mr. Depew's speech in his pocket, but was very careful not to let us or any of his officers read it or the telegram, and stated that the New York Journal had that day offered him 2500 dollars for them, but he told them that not for \$25,000 could they see them until after Saturday night.

Mr. Hawley told us that after the event all the instruments used, Mr. Depew's speech and telegram, with photographs of Edison and Depew would be authentically labeled and presented to the Smithsonian Institute at Washington, thus perpetuating the sending and receiving a telegraph message the longest distance ever wired.

Dr. Raymenton and Mr. Macomber expect the new chemicalizer will be finished by June 1st. The question has been asked if the new machine will be brought to Worcester. It is the intention to exhibit it in the principal centers of

the country and the gentlemen state that Worcester is the center of the universe, and as leading citizens are stockholders in the Macomber Company and the home press have treated them so kindly, they shall certainly exhibit it here in due season.



"So I let go of the lines."

Here are two more of our "Moving Pictures of History," intended to show how men progress, AND HOW FAR THEY MAY HOPE STILL TO GO.

You see here two pictures of lightning and its power in the history of the human race.



First, the lightning's dash terrifies the ignorant savage. He crouches in dread, he sees a mysterious god in the lightning. He begs for mercy, and promises to the savage god, created by his savage brain and ignorant fear, all kinds of savage rewards for safety.

The savage promises that he will kill an ox and give its blood to the god of lightning if the lightning doesn't hit him. He will even kill a human being, or a dozen of them, and offer up their blood to please the god of hatred and wrath if his own miserable life can be spared.



History moves, and the next picture shows you Thomas A. Edison to-day and the lightning at man's intellect, sees it to-day.

Edison doesn't hang his head on the earth in adoration of the lightning. He doesn't fear it, or make promises to lightning's god. He says: "That is a pretty good kind of lightning, brighter than kerosene oil or candles. I'll use it for lamps to read my books. I'll use it for the phonograph to write my words. I'll use it for power to run my machinery."

There is progress, proof that man is going upward. Between the cringing savage, bowing before the lightning and the thunder, and the scientist Edison recognizing a beneficent creation and man's power over the earth, there is a wide and wonderful step.

Wider and more wonderful will be the numerous other steps from the Edison of to-day to the finished human being of the great future.

Boston American, Aug. 13, 1909.

SUPPLEMENT

UNBOUND CLIPPINGS SERIES

[William K. L. Dickson and Antonia Dickson. "Edison's Invention of the Kinetograph." From *Century Magazine*, vol. 48 (June 1894)]

EDISON'S INVENTION OF THE KINETO-PHONOGRAPH.

In the year 1867, the idea occurred to me that it was possible to devise an instrument which should do for the eye what the phonograph does for the ear, and that by a combination of the two, all action and sound could be recorded and reproduced simultaneously. This idea, the germ of which came from the little toy called the Zetoscope, and the work of Maybridge, Maris, and others, had now been accomplished, so that every change of facial expression can be recorded and reproduced life size. The Kinetoscope is only a small model illustrating the present stage of progress, but with each succeeding month new possibilities are brought into view. I believe that in coming years, by my own work and that of Edison, Maybridge, Maris, and others who will doubtless enter the field, that grand opera can be given at the Metropolitan Opera House at New York, without any material change from the original, and with artists and musicians long since dead.

The following article which gives an able and reliable account of the invention has my entire endorsement. The authors are peculiarly well qualified for their task from a literary standpoint and the exceptional opportunity which Mr. Dickson has had in the fruition of the work.

Thomas A. Edison

ACCOUNT OF THE INVENTION.

THE synchronous attachment of photography with the phonograph was early contemplated by Mr. Edison. In order to record and give back the impressions to the eye as well as to the ear.

The comprehensive term for this invention is the kineto-phonograph. The dual "taking-

age impressed on the sensitive surface of the shell. The photographic portion of the undertaking was seriously hampered by the defects of the materials at hand, which, however excellent in themselves, offered no substance sufficiently sensitive. How to secure clean-cut outlines, or indeed any outlines at all, to



FIGURE OF THE KINETOGRAPHIC THEATRE, EDISON'S LABORATORY, ORANGE, N. J., SHOWING PHOTOGRAPH AND KINETOGRAPH.

"machine" is the photo-kinetograph, and the reproducing-machine the photo-kinetoscope, in contradistinction to the kinetograph and the kinetoscope, which retain respectively to the taking and reproduction of movable but soundless objects.

The initial experiments took the form of microscopic pin-point photographs, placed on a cylindrical shell, corresponding in size to the ordinary phonograph cylinder. These two cylinders were then placed side by side on a shaft, and the sound record was as keen as now is possible synchronously with the photographic im-

pressions. The first and pictures of this article copyright, 1894, by ARTHUR A. & W. K. L. DICKSON.

The photographs are by Mr. Dickson.

William K. L. Dickson and Antonia Dickson. "Edison's Invention of the Kinetograph." *From Century Magazine*, vol. 48 (June 1894)]

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ness when it became a question of enlarging the pin-point photographs to the dignity of one-eighth of an inch, projecting them upon a screen, or viewing them through a binocular microscope. Each recession of time augmented the difficulty, and it was resolved to abandon that line of experiment, and to revolutionize the whole nature of the proceedings by discarding these small photographs, and substituting a series of very much larger impressions affixed to the outer edge of a swiftly rotating wheel, or disk, and supplied with a number of pins so arranged as to project under the center of each picture. On the rear of the disk, upon a stand, was placed a Geissler tube, connected with an induction coil, the primary wire of which, operated by the pins, produced a rupture of the primary current, which, in its turn, through the medium of the secondary current, lighted up the Geissler tube at the precise moment when a picture ceased its range of view. This electrical discharge was performed in such an inappreciable fraction of time, the succession of pictures was so rapid, and the whole mechanism so nearly perfect, that the goal of the inventor seemed almost reached.

Then followed some experiments with drums, over which sheets of sensitized collodion film were drawn, the edges being pressed into a narrow slot in the surface, similar in construction to the slot in the photograph. A starting and stopping device very similar to the one now in use was also applied. The pictures were then taken spirally to the number of two hundred or so, but were limited in size, owing to the irregularity of surface which brought only the center of the picture into focus. The sheet of collodion was then developed, fixed, the end placed upon a transparent drum, bristling at its outer edge with brass pins. When the drum was rapidly turned, these came in contact with the primary current of an induction coil, and each image was lighted up in the same manner as described in the previous disk experiment, with this difference only, that the flicker of the drum was illuminated.

The next step was the adoption of a highly-sensitized strip of celluloid half an inch wide, but this proving unsatisfactory, owing to inadequate size, one-inch pictures were substituted on a hand one and a half inches wide, the additional width being required for the perforations on the outer edge. These perforations occur at close and regular intervals, in order to enable the teeth of a feeding device to hold the film steady for nine eighths of the one forty-sixth part of a second, when a shutter opens rapidly and admits a beam of light, causing an image of phase in the movement of the subject. The film is then jerked forward in the remaining one tenth of the one forty-sixth part of a

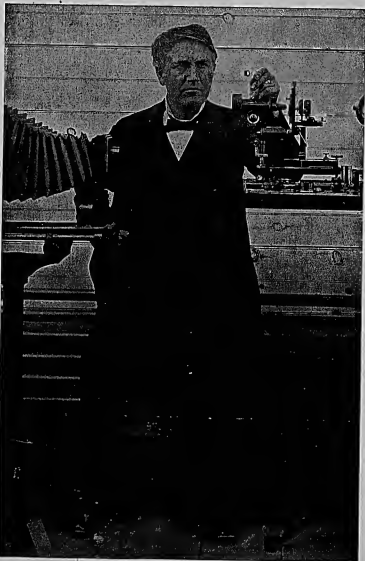
second, and held at rest while the shutter has again made its round, admitting another circle of light, and so on until forty-six impressions are taken in second, or sixty a minute. This speed yields 165,600 pictures in an hour, an amount amply sufficient for an evening's entertainment, when unrolled before the eye. By connecting the two ends of the strip, and thus forming a continuous band, the pictures can be indefinitely multiplied. In this connection it is interesting to note that were the spinnist motions added up by themselves, exclusive of arrests, on the same principle that a train record is composed independent of stoppages, the incredible speed of twenty-six miles an hour would be shown.

The advantage of this system over a continuous band, and of a shutter shutter-forging widely ahead of the film, would be this, that in that case only the fractional degree of light comprised in the last part of a second is allowed to penetrate to the film at a complete sacrifice of all detail, whereas, in the present system of stopping and starting, each picture gets one hundredth part of a second's exposure, with a lens but slightly stopped down—lens amply sufficient, as any photographer knows, for the attainment of excellent detail even in an ordinarily good light. It must be understood that only one camera is used for taking these strips, and not a battery of cameras, as in Mr. Muybridge's photographs of "The Horse in Motion."

The next step, after making the negative ready to form a positive or finished series of reproductions from the negative, which is passed through a machine for the purpose, in connection with a blank strip of film, which, after development and general treatment, is replaced in the kinesiograph or photo-kinesiograph, as the case may be. When a photograph record has been taken simultaneously with such a strip, the two are started together by the use of a simple but effective device, and kept so all through, the photographic record being in perfect accord with the strip. In this conjunction, the tiny holes with which the edge of the celluloid film is perforated, correspond exactly with the photographic records, and the several devices of the camera, such as the shifting of the film and the operation of the shutter, are so regulated as to keep pace with the indentation made by the stylus upon the photographic wax cylinder, one motor serving as a source of common energy to camera and phonograph, when they are electrically and mechanically linked together.

The establishment of harmonious relations between wax cylinder and phonograph was a narrow way, and would have broken the safety of inventiveness insured to hardship and discour-

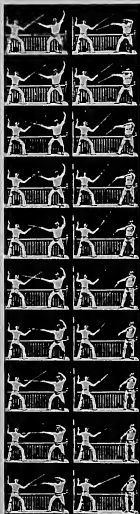
See THE CENTURY for July, 1894.



THOMAS A. EDISON, 1893.

[William K. L. Dickson and Antonia Dickson. "Edison's Invention of the
Kineto-Phonograph." From *Century Magazine*, vol. 48 (June 1894)]

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THE PRINCIPLE. THE ACTION OF THE KINETOGRAPH, SHOWING SEVERAL POSITIONS IN ONE.

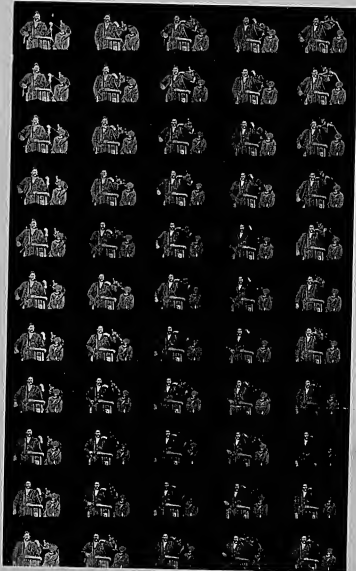
agement than Edison's veterans. The experiments have borne their legitimate fruit, and the

most scrupulous nicety of adjustment has been achieved, with the resultant effects of realistic life, hardly visually expressed.

The process of "taking" is variously performed, by artificial light in the photographic department or by daylight under the improved conditions of the new theater, of which we shall speak. The actors, when more than one in number, are kept as close together as possible, and exposed either to the glare of the sun, to the tanning light of four parabolic magnesium lamps, or to the light of twenty arc-lamps, provided with highly actinic carbons, supplied with powerful reflection equal to about 50,000 candle-power. This radiant concentration upon the performers while the kinetograph and phonograph are held at work storing up records and impressions for future reproduction.

A popular and inexpensive adaptation of the kinetoscopic method is in the form of the well-known nickel-in-the-slot, a machine consisting of a cabinet containing an electrical motor and batteries for operating the mechanism which acts as the impelling power to the film. The film is in the shape of an endless band fifty feet in length, which is passed through the field of a magnifying-glass perpendicularly placed before the eye at the rate of forty-six per second, through the medium of a rotating, notched disk, the set exposing a picture at each revolution, and separating the fractional gradations of pose. Projected against a screen, or viewed through a magnifying-glass, the pictures are minutely visible, for the reason that the enlargement need not be more than ten times the original size. On exhibition evenings the projecting-room, which is situated in the upper story of the photographic department, is lit with black, in order to prevent any reflection from the circle of light emanating from the screen at the other end, the projector being placed behind a curtain, also of black, and provided with a single peep-hole for the accommodation of the lens. The effect of these somber draperies, and the weird accompanying monotone of the electric motor attached to the projector, are horribly impressive, and one's sense of the supernatural is heightened when a figure suddenly springs into his path, acting and talking with a vigor which leaves him totally unprepared for its mysterious vanishing. Projected stereoscopically, the results are even more realistic, as those acquainted with that class of phenomena may imagine, and a pleasing roundness is imparted, which in ordinary photographic displays, is conspicuous by its absence.

Nothing more wild or more natural could be imagined than these breathing, visible forms, with their ticks of familiar gesture and speech. The inexpressible new phase of the phonograph



"HAROLD HINDS." KINETOGRAPHIC VIEW, SHOWING FIVE SECTIONS OF THE STAGE.

[William K. L. Dickson and Antonia Dickson. "Edison's Invention of the
Kineto-Phonograph." From *Century Magazine*, vol. 48 (June 1894)]

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successions, and the exquisite synchronism of the phonographic attachment, have removed the last trace of automatic action, and the illusion is complete. The organ-grinder's monkey jumps upon his shoulder to the accompaniment of a strain from "Nones." The rich strains of a tenor exultation are heard, seen in their appropriate dramatic action; the blacksmith is seen swinging his ponderous hammer, exactly as in life, and the clang of the anvil keeps pace with his symmetrical movements; along with the rhythmical measures of the dancer go her soft-sounding footfalls; the wrestler and fencer ply their intricate game, parrying, parrying, attacking, thrusting, and thrusting, while the quick flash of the eye, the tension of the mouth, the dilated nostrils, and the strong deep breathing give evidence of the potentialities within.

The photographic rooms, with their singular completeness of appointment, have been the birthplace and nursery of this invention; and the most important processes connected with the preparation and development of the film, together with other mechanical and scientific devices, are still carried on in this department.

The exigencies of natural lighting incident to the better making of the subject, and the lack of a suitable theatrical stage, however, necessitate the construction of a special building, which stands in the center of that cluster of auxiliary houses which forms the suburbs of the laboratory, and which is of so peculiar an appearance as to challenge the attention of the most superficial observer. It does not architectural rules, embraces no conventional materials, and follows no accepted scheme of color. Its shape is an irregular oblong, rising abruptly in the center, at which point a movable roof is attached, which is easily raised or lowered at the will of a single manipulator. Its color is a green and forbidding black, enveloped by the dull luster of many hundred metallic points; its majestic is paper, covered with plaid and profusely studded with tin nails. With its flapping sail-like roof and elven hue, it has a weird and semi-austere appearance, and the uncanny effect is not lessened when, at an imperceptible signal, the great building wings slowly upward upon a graptiled center, presenting any given angle to the eyes of the sun, and rendering the observer independent of diurnal variations. The movable principle of this building is identical with that of carrier's winged balloons; the sides being suspended by iron rods from the black center-points. This building is known as the Kinematograph Theater, otherwise the "Black Maria." Entering, we are confronted by a system of lights and shades so lately discovered as to pain the eye, accustomed to the uniform radiance of the outer air. Then we find that the contrasts are effected by the total

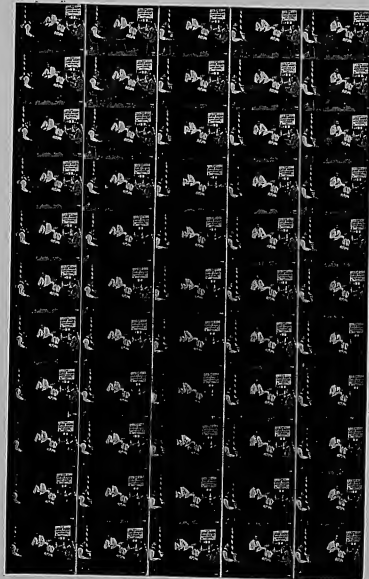
exclusion of light from the lower end of the hall, heightened by omphres of impalpable black, against which stand out in sharp relief the central straps, on which are placed the kinematographic subjects, basked in the full power of the solar rays pouring down from the movable roof. This distribution of light and shade is productive of the happiest effects in the films, as the different figures are thrown into the broadest relief against the black background, and a distinctness of outline is achieved that would be impossible under ordinary conditions.

At the other end of the hall is a cell, indicated by an ordinary door and an extraordinary window, placed in panels of a lurid hue, which gives the finishing touch to the Rembrandtesque character of the picture. The compartment is devoted to the purpose of changing the film from the dark box to the kinematographic camera, being provided with a special rack, running from the mysterious recesses at the back of the stage to its own special precincts, where fresh films are substituted for the ones already employed. The processes of development, etc., are performed in the main photographic building.

The dramatic personae of this stage are recruited from every characteristic section of social, artistic, and industrial life, and from many a phase of animal existence. One day shrouded the frogmen of a troop of trained bears and their Hungarian leader. The bears were divided between airy discontent and a comfortable desire to follow the bent of their own inclinations. It was only after much persuasion that they could be induced to subserve the interests of science. One furry monster waddled up a telegraph-pole, to the tolling of his own indignant growl; another settled himself comfortably in a deep arm-chair, with the air of a connoisseur in social science; a third rose solemnly on his hind legs and described the measures of some dance; to the wild strains of his keeper's music. Another licked his master's swarthy face, another accepted his keeper's challenge, and engaged with him in a wrestling-match, strutting, lunging, and rolling on the ground.

Of human subjects are have a superficially, although the utmost discrimination is essential in the selection of them. The records embrace pugilistic encounters, trapeze and cane exercises, dancing, wrestling, fencing, singing, the playing of instruments, speech-making, the most involved in the different crafts, horse-shoeing, equestrianism, gardening, and many others.

We have yet to speak of the microscope subjects, a class of especial interest, as lying outside of the limited sphere of man. In the treatment of these infinitesimal types, much



[William K. L. Dickson and Antonia Dickson. "Edison's Invention of the Kinetograph." From *Century Magazine*, vol. 48 (June 1894)]

514 EDISON'S INVENTION OF THE KINETO-PHONOGRAPH.

difficulty was experienced in obtaining a perfect adjustment so as to reproduce the breathing of insects, the circulation of blood in a frog's leg, and other similar processes of nature. The enlargement of minuscule is a drop of stagnant water proved a most exacting task, but by the aid of a powerful lime-light, concentrated on the water, by the interposition of silver cells for the intensification of most of the heat rays, and by the use of a quick shutter and kindred contrivances, the obstacles were overcome, and the final results were such as fully to compensate for the expenditure of time and trouble. We will suppose that the operator has at last been successful in impressing the tricky water-globules on the sensitive film, in developing the positive strip, and placing it in the projector. A series of inch-large shapes then springs into view, magnified stereoscopically to nearly three feet each, gruesome beyond power of expression, and exhibiting an indescribable eeriness and rage. Monsters close upon each other in a blind and indiscriminate attack, limbs are dismembered, gory globules are tugged, whole battalions disappear from view. Before the ruthless consummation of these martial tactics the Kikenny cete fade into insignificance. A curious feature of the performance is the passing of these creatures in and out of focus, appearing sometimes as huge and distorted shadows, then springing into the reality of their own size and proportions.

Hitherto we have limited ourselves to the

delineation of detached subjects, but we shall now touch very briefly upon one of our most ambitious schemes, of which these scattered impressions are but the heralds. Preparations have long been on foot to extend the number of the actors and to increase the stage facilities, with a view to the presentation of an entire play, set in its appropriate frame.

This line of thought may be indefinitely pursued, with application to any given phase of indoor or outdoor life which it is desired to reproduce. Our methods point to ultimate success, and every day adds to the security and the coloration and extensiveness, but will eventually be within reproductive power. Martial revolutions, naval exercises, processions, and countless kindred exhibitions will be recorded for the leisure of attendance, or who desire to recall them.

The invalid, the isolated country recluse, and the harassed business man can indulge in needed recreation, without undue expenditure, without fear of weather, and without the sacrifice of health or important engagements. Not only our own resources but those of the entire world will be at our command. The advantages to students and historians will be immeasurable. Instead of dry and misleading accounts, tinged with the exaggeration of the chroniclers' minds, our archives will be enriched by the vivid pictures of great national events, intimate with all the glowing personalities which characterized them.

Antonia and W. K. L. Dickson.

WILLIAM K. L. DICKSON.
RESEARCH OF EDISON'S KINETOGRAPHIC THEATRE, OAKLAND, N. J.

SUPPLEMENT

COMPANY RECORDS SERIES

**NEW JERSEY AND PENNSYLVANIA
CONCENTRATING WORKS**

NEW JERSEY AND PENNSYLVANIA CONCENTRATING WORKS
PLANT OPERATIONS RECORDS

Pocket Notebook, PN-99-06-22

This pocket notebook covers the period December 1898-January 1900. The entries in the first part of the book are by Edison and Emil Herter, chief draftsman at the ore milling plant in Ogden, New Jersey. The remaining entries [not selected] are all by Herter. The Edison material consists primarily of notes regarding the operation and performance of conveyors, rock crushers, rollers, hoppers, pulleys, and belts at the Ogden plant. These notes contain many suggestions and proposals for improvements to the machinery. The entries by Herter are mainly notes, drawings, and measurements pertaining to the construction of buildings and installation of machinery. Included is material relating to conveyors, elevators, and rolls. The activity recorded in these books corresponds with some of the subjects discussed by Herter in *Thomas A. Edison v. Allis Chalmers et al.*

PLANT OPERATIONS RECORDS NOT SELECTED

Several additional documents from the New Jersey and Pennsylvania Concentrating Works Records that were uncovered since the filming of Part III have not been selected because they contain routine information or duplicate records found elsewhere.

Notebook, N-91-08-00

This notebook covers the period August 1891-February 1899. It was used by Francis R. Upton to record sales of ore concentrate and sand. Included are details about purchasers, volume, and date of sale. Similar information can be found in "Sales Abstract #2" in the NJPCW Sand Sales Records (*Thomas A. Edison Papers: A Selective Microfilm Edition, Part III*, 154; 679-744).

Pocket Notebooks, PN-00-01-03, PN-00-05-11,
PN-00-07-10, PN-00-09-20

These pocket notebooks cover the period January-September 1900. They were used by Emil Herter, chief draftsman at the Ogden plant, serving in the capacity of a mechanical engineer. The books contain primarily notes, drawings, and measurements regarding buildings and machinery. Included is material relating to conveyors, elevators, and rolls. The activity recorded in these books corresponds with some of the subjects discussed by Herter in *Thomas A. Edison v. Allis Chalmers, et al.*

Pocket Notebook, PN-00-09-14

This notebook covers the period September-October 1900. It contains notes about mine cuts and ore assays from samples taken from trenches at the Ogden mine site.

Tracings Ledger (1893-1903)

This ledger covers the period April 1893-June 1903. It is an index to about 3,000 linen drawings, a small sample of which can be found in the NJPCW Plant Operation Records, *Thomas A. Edison Papers: A Selective Microfilm Edition, Part III*, 151: 494-504. Included is the drawing number, description, date, and drafter's name. A few pages contain notes and drawings pertaining to company equipment and buildings.

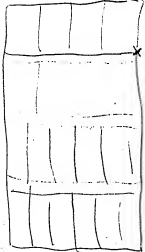
**New Jersey and Pennsylvania Concentrating Works Records
Plant Operations Pocket Notebook, PN-99-06-22**

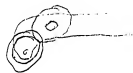
This pocket notebook covers the period December 1898-January 1900. The entries in the first part of the book are by Edison and Emil Herter, chief draftsman at the ore milling plant in Ogden, New Jersey. The remaining entries [not selected] are all by Herter. The Edison material consists primarily of notes regarding the operation and performance of conveyors, rock crushers, rollers, hoppers, pulleys, and belts at the Ogden plant. These notes contain many suggestions and proposals for improvements to the machinery. The entries by Herter are mainly notes, drawings, and measurements pertaining to buildings and machinery. Included is material relating to conveyors, elevators, and rolls. The activity recorded in these books corresponds with some of the subjects discussed by Herter in *Thomas A. Edison v. Allis Chalmers et al.* (*Thomas A. Edison Papers: A Selective Microfilm Edition, Part III*, 118: 887-928). The front cover is labeled "9." The pages are unnumbered. Approximately 100 pages have been used.

17

PN-99-06-22

20x20
400-
8
2900. 475
24
120000 1900
950
11400.

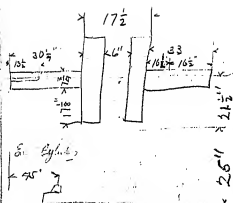




Near wheels of No 3
Canyon / 1/2 in. diameter
in rock with oil
pocket; B-1303 - Seal.
OK

There should be a
tightener

We may have to bolt
timbers etc. holding
jackshafting & high
down to rock below -
The pans have a
powerful upward thrust

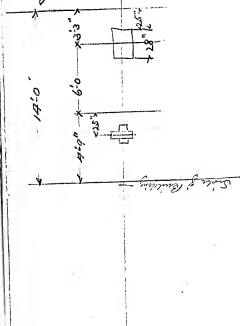


Bevel gears of 3H high
 Jack ~~run~~ over, oil
 pockets, etc, B. Hus
 OK

Angle gears on main
 shaft ~~run~~ over

WE want side guide
 roller put on to prevent
 3H gears vibrating
 & jumping off -
 & strike a race

Dec. 7th 1898 Port. 110.4th.
Line shaft 153 Rev
Pulley on line 20. on Port. 65"



on each side $\frac{1}{2}$ way
up will at a position
it need not touch roll
The roll could be of
wood as it probably
will be too heavy if of
iron for the momentary
touch. We have had
several bad shut
downs on account
of rope jamming
& cannot so clear

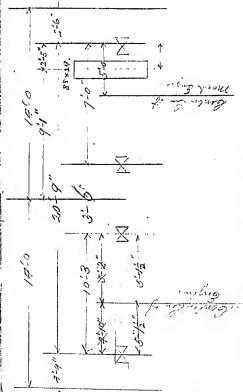
$$\begin{array}{r} 12 \\ 60 \times 48 \\ \hline 2880 \\ 7 \overline{) 2880} \\ \underline{2100} \\ 780 \\ 7 \overline{) 780} \\ \underline{700} \\ 80 \end{array}$$

$$\begin{array}{r} 5 \\ 60 \times 68 \\ \hline 4080 \\ 100 \end{array}$$

$$\begin{array}{r} 100 \times 100 \times 96 \times 80 \\ 96 \times 80 \\ \hline 768 \times 80 \\ 9 \overline{) 76800} \\ \underline{7200} \\ 4800 \\ 9 \overline{) 4800} \\ \underline{4500} \\ 300 \\ 9 \overline{) 300} \\ \underline{270} \\ 300 \\ 9 \overline{) 300} \\ \underline{270} \\ 300 \end{array}$$

apable of being lowered
as we may be compelled to
use soft iron & the wear
will be great, hence
the top hopper may
have to be lowered
2" inches or more to
compensate for the wear.

We should use the
make bottom
hopper if at
end of the run



The hopper would best be made of sheet iron with removable plate in bottom for ore to run on.

The wobblers used as
3 Hg's are inconvenient
- we can get along with
them for a while but
those on plan suggested
by Audubon should be



put in as soon as we
have time —

I think we may have
to ~~cut~~ down to
rock below the
Wabblers pillow block
Ⓢ the shaft having
been gone as the
lifting action both
of Wabblers & pinion is
gone for the

18 Ears for B&B 4000

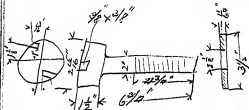
roller feed should be
a drop shutter cutting
off the ore perfectly
so no struggling process

Can get to the rolls

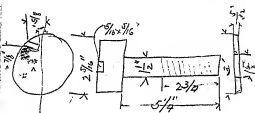
Don't forget that the
clutch for working
Top & Bottom feeds
should be arranged

so they can be operated
from top or bottom

Grand Roll Slugg. Pts.

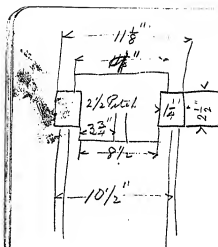


15 - Winters



224 for Int. Pts.
218 " Grand Roll. —

We should have a
take up the wire for
the even rope of the
34. High, when rope
gets slack so piston
strikes head of
piston. cylinder
we have to splice
rope & then take $\frac{1}{2}$
day - with take
up this would be
obviated —



24" 1st + 2nd 36 -

Mandrel taken out +
fixed for ~~gear~~ oil collar
Thrust bearings put in
sight feed - bushes reversible

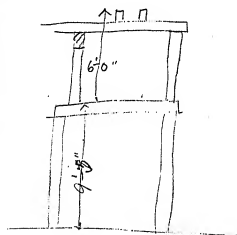
gears of 24 1st + 2nd 36
Covered with oil Seal.

Chilled iron check
plates put in rolls

Formal Photo for Lewis & Clark

#5 Battery Port # 1567 } Dig.
12 " " 1568 } 26.1994

The Idler on 24" is poor
see Edson & improve it.
Its reported that idler
dont take up in straight
line says it goes out
line when no load.
Not stiff enough & its
constantly adjusted
by men on stage
but never stays adjusted
The Rope has broken
twice —



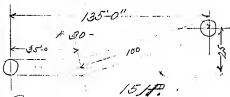
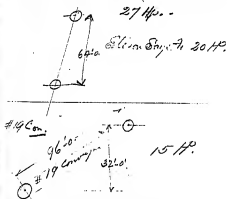
Big frame dryer 1

The clothes should be put on the line belt and it has to be taken up quite frequently - The clothes should be stiff but light so there is no cross wind to bend the pulley in the clothes frame. The weights should be hung with a spring direct if possible.

Elevator # 10 San. House.
27 Hrs.

27th.

Eliza Bay 7 20 HP.



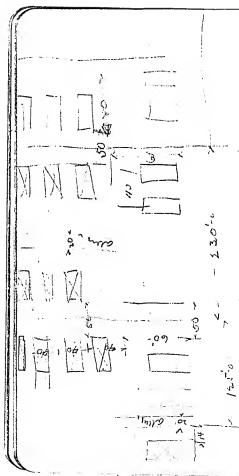
One N. 12 will do for Dynamo

4. 6 on each Conveyor
will do

4 & 5 Temporary
New removable tooth
springs to be put in.

One of the open end wheels acting as gears is to have an adjustment on the clutch line of conveyor sprockets can be adjusted see 2d. sk. —

Great to have you
Cover OK

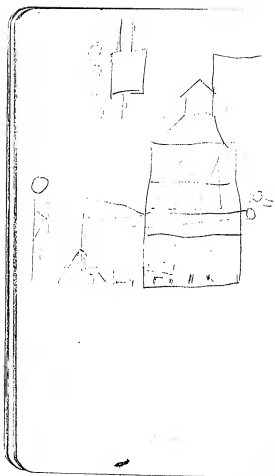


Angle gears Crumley
plant.

There is too much up & down
shake in pillow blocks.

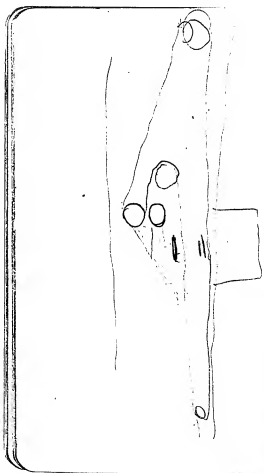
From \odot to 62 picture.

To prevent too much
vibrating I will say
that all gears
in \odot must have
Caseings



also that all belts
in mill should have
tightness properly
designed to prevent
Cross wind & properly
weighted due to it
through the

Cross can open head
1068 lbs to be
supported with
Elev Rod and provide



propeller work etc

The other in 2nd 36"

Rolls is a bad one
badly arranged
gives lots trouble

2nd 36. new style ✓
chilled check piece

Semicircular wing
around roller feed
2nd 36 shown on
drawing - these nominal
can not in a week

2nd 36 Rolls -

Reported that two
wood bolts in
housings have not
been replaced since
shortener plate
was shifted,
- former says plate
prevent them from
going in

Report says Drive pulley
bolt broken also
loose, this reported
20 June

A Door should
be cut up side
of it to Rall
happen for fear of
accidents.

fixed door of 1st 36
Ralls should be
changed to a swing
door -

Intermedial

Bushes taken out
+ Oil devices
attached, yellow
block drilled for
oil pipe - groove
pocket arranged
with pipe for
water & oil -

Sheet steel dust
guard put over
inside brang

Fish drums to have
raps provided with
unshoes with
a better device for
regulating pressure
an index to tell
men Relations.

pressure by position
Buses made available
if possible
Same as last

2d. giving tension
to belt driving pulley
rolls Not want
something better -

[ITEM FOUND IN BOOK]

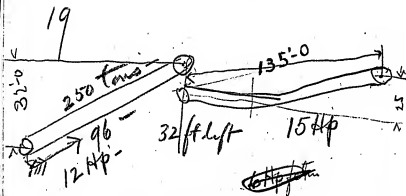
Elevator will never take
over 20 Hp = about 800 lbs.
Can go on ~~power plant~~
power station or Frenchy

Comozor 19 12 Hp } — 1000⁰⁰
Dum Comoz 15 Hp }

Bath Conveyors on
Mc 98 Eng in mill 1 -

One No 12 will do for
Dynamo -
a No 6 on Each Conveyor
will do

Elev 64' = '300 — 27/4p

[illegible]

[ITEM FOUND IN BOOK]

$$\begin{array}{r} 12 \\ 20 \\ \hline 240 \\ 12 \overline{) 480} \end{array} (40 \text{ hp})$$

SUPPLEMENT
SPECIAL COLLECTIONS SERIES
CHARLES BATCHELOR COLLECTION

A Note on the Filming of the Batchelor Scrapbooks

Although each scrapbook page is represented on the microfilm, the contents of the scrapbooks have not been filmed in their entirety. Some of the pages contain oversize clippings that cannot be completely unfolded without obscuring other clippings. Each scrapbook page has been filmed at least once, in such a manner as to convey the greatest amount of bibliographic and substantive information about the clippings on the page. All substantive clippings directly concerned with Edison have been filmed in their entirety except for a few large newspaper pages that are too brittle to unfold.

Charles Batchelor Scrapbook, Cat. 1346

This scrapbook covers the period 1890-1894 and contains clippings about a variety of subjects. Included are newspaper interviews and profiles of Edison. Other items pertain to the formation of the General Electric Co. and the personal and financial consequences for Edison; the financial affairs of the Westinghouse Electric Co.; and the decision of the U.S. Circuit Court of Appeals in the patent infringement suit, *Edison Electric Light Company v. United States Electric Lighting Company*. Additional clippings relate to aerial navigation; the disappearance of Edison associate Frank McGowan; and Edison's iron ore concentration plant at Ogden, New Jersey. Also included are an 1890 letter of introduction written for Batchelor by Edison; a passport issued to Batchelor by the U.S. Consulate in Athens, Greece, in 1893; passenger lists from transatlantic crossings; and invitations to various social events. The spine is stamped "Scrapbook 1890." The book contains 133 numbered pages. The clippings are individually numbered 2999-3202; some items are missing.

St. Louis, Dec. 24 (Special).—The Adams Express

THE BEEHIVEHOLSE COMPANY

PHILADELPHIA, Dec. 27 (Special).—The adjournment of the committee appointed by President Jackson to inquire into the

The committee also has the privilege either to use or refuse the money, and, if deemed suitable, to

FLUOR.

At a banquet given by the Grocers' Company in

money enough to retire from congressional pursuits.

On his mother's death the boy went to live with an

small sum was soon exhausted, and, after losing 10

troubles incident to the Crimean War, and by the re-

the history of Augustus.

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1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2057 2058 2059 2060 2061 2062 2063 2064 2065 2066 2067 2068 2069 2070 2071 2072 2073 2074 2075 2076 2077 2078 2079 2080 2081 2082 2083 2084 2085 2086 2087 2088 2089 2090 2091 2092 2093 2094 2095 2096 2097 2098 2099 2100 2101 2102 2103 2104 2105 2106 2107 2108 2109 2110 2111 2112 2113 2114 2115 2116 2117 2118 2119 2120 2121 2122 2123 2124 2125 2126 2127 2128 2129 2130 2131 2132 2133 2134 2135 2136 2137 2138 2139 2140 2141 2142 2143 2144 2145 2146 2147 2148 2149 2150 2151 2152 2153 2154 2155 2156 2157 2158 2159 2160 2161 2162 2163 2164 2165 2166 2167 2168 2169 2170 2171 2172 2173 2174 2175 2176 2177 2178 2179 2180 2181 2182 2183 2184 2185 2186 2187 2188 2189 2190 2191 2192 2193 2194 2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207 2208 2209 2210 2211 2212 2213 2214 2215 2216 2217 2218 2219 2220 2221 2222 2223 2224 2225 2226 2227 2228 2229 2230 2231 2232 2233 2234 2235 2236 2237 2238 2239 2240 2241 2242 2243 2244 2245 2246 2247 2248 2249 2250 2251 2252 2253 2254 2255 2256 2257 2258 2259 2260 2261 2262 2263 2264 2265 2266 2267 2268 2269 2270 2271 2272 2273 2274 2275 2276 2277 2278 2279 2280 2281 2282 2283 2284 2285 2286 2287 2288 2289 2290 2291 2292 2293 2294 2295 2296 2297 2298 2299 2300 2301 2302 2303 2304 2305 2306 2307 2308 2309 2310 2311 2312 2313 2314 2315 2316 2317 2318 2319 2320 2321 2322 2323 2324 2325 2326 2327 2328 2329 2330 2331 2332 2333 2334 2335 2336 2337 2338 2339 2340 2341 2342 2343 2344 2345 2346 2347 2348 2349 2350 2351 2352 2353 2354 2355 2356 2357 2358 2359 2360 2361 2362 2363 2364 2365 2366 2367 2368 2369 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384 2385 2386 2387 2388 2389 2390 2391 2392 2393 2394 2395 2396 2397 2398 2399 2400 2401 2402 2403 2404 2405 2406 2407 2408 2409 2410 2411 2412 2413 2414 2415 2416 2417 2418 2419 2420 2421 2422 2423 2424 2425 2426 2427 2428 2429 2430 2431 2432 2433 2434 2435 2436 2437 2438 2439 2440 2441 2442 2443 2444 2445 2446 2447 2448 2449 2450 2451 2452 2453 2454 2455 2456 2457 2458 2459 2460 2461 2462 2463 2464 2465 2466 2467 2468 2469 2470 2471 2472 2473 2474 2475 2476 2477 2478 2479 2480 2481 2482 2483 2484 2485 2486 2487 2488 2489 2490 2491 2492 2493 2494 2495 2496 2497 2498 2499 2500 2501 2502 2503 2504 2505 2506 2507 2508 2509 2510 2511 2512 2513 2514 2515 2516 2517 2518 2519 2520 2521 2522 2523 2524 2525 2526 2527 2528 2529 2530 2531 2532 2533 2534 2535 2536 2537 2538 2539 2540 2541 2542 2543 2544 2545 2546 2547 2548 2549 2550 2551 2552 2553 2554 2555 2556 2557 2558 2559 2560 2561 2562 2563 2564 2565 2566 2567 2568 2569 2570 2571 2572 2573 2574 2575 2576 2577 2578 2579 2580 2581 2582 2583 2584 2585 2586 2587 2588 2589 2590 2591 2592 2593 2594 2595 2596 2597 2598 2599 2600 2601 2602 2603 2604 2605 2606 2607 2608 2609 2610 2611 2612 2613 2614 2615 2616 2617 2618 2619 2620 2621 2622 2623 2624 2625 2626 2627 2628 2629 2630 2631 2632 2633 2634 2635 2636 2637 2638 2639 2640 2641 2642 2643 2644 2645 2646 2647 2648 2649 2650 2651 2652 2653 2654 2655 2656 2657 2658 2659 2660 2661 2662 2663 2664 2665 2666 2667 2668 2669 2670 2671 2672 2673 2674 2675 2676 2677 2678 2679 2680 2681 2682 2683 2684 2685 2686 2687 2688 2689 2690 2691 2692 2693 2694 2695 2696 2697 2698 2699 2700 2701 2702 2703 2704 2705 2706 2707 2708 2709 2710 2711 2712 2713 2714 2715 2716 2717 2718 2719 2720 2721 2722 2723 2724 2725 2726 2727 2728 2729 2730 2731 2732 2733 2734 2735 2736 2737 2738 2739 2740 2741 2742 2743 2744 2745 2746 2747 2748 2749 2750 2751 2752 2753 2754 2755 2756 2757 2758 2759 2760 2761 2762 2763 2764 2765 2766 2767 2768 2769 2770 2771 2772 2773 2774 2775 2776 2777 2778 2779 2780 2781 2782 2783 2784 2785 2786 2787 2788 2789 2790 2791 2792 2793 2794 2795 2796 2797 2798 2799 2800 2801 2802 2803 2804 2805

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5015 NICKEL-IN-THE-SLOT PORTRAITS.
N.Y. Tribune. Jan 2 1891
SIT DOWN AND GET A PICTURE OF YOURSELF IN
THREE MINUTES.

The pellets are not irregular or rebarbed plasticographs, but are very soft tin-types, 1-1.8 by 1.3-1.5 inches, and the operation of taking them is exceedingly simple, consisting of sitting in front of the camera, dropping in a nickel and turning a crank. In three minutes the picture is delivered.

3016

3017 The Montana Consolidated Tin Mining Company, recently incorporated under the laws of Illinois, with an authorized capital stock of \$2,000,000, proposes to work deposits of tin ore discovered in value, not specially enumerated, 35 per cent.; also provides for minerals wholly or in part of copper, not specially enumerated, 45 per cent.; also provides that "if two or more rates of duty should be applicable to any imported article, it shall be classified under the highest of such rates." The decision is affirmed.

a ten, leaving a handsome margin of profit. Captain Carroll, who is in Washington seeking to be admitted to Congress as a Delegate from Alaska, is one of the successful miners of this newly developed country. He has been a speculator in lands in the State of Washington and in mining in Alaska. One of his most successful ventures

[illegible]

L. C. Crawford.

Pittsburgh, January 10.—Contrary to expectation, the return to the subscribers of the first subscription to the Westinghouse Re-Fund by the Advisory board did not weaken the stock from yesterday's advance, when it sold at 100 and 101 on the exchange. Nothing else was dealt in at the market on the Pittsburgh Exchange to-day, the opening sales were sixty shares at 100. This was followed by the sale of 100 at 7 1/2 later by 30 at 7 1/2. George B. Bliss & Company are buyers, and it is believed to be on account of Boston and New York, the former probably predominating.

Pittsburg, January 15.—It is generally believed that there were two reasons that led the Advisory Committee to return the money to the subscribers, one being that the resolution under which the committee is acting entailed

them the arrangement for the extension of the
the duties of general creditors, something
that would lead to weeks of hard work, and for
which the members did not have time. The
other reason was that the Committee could
not use the money without practically assum-
ing the direction of the business of the com-
pany, which they did not intend to do. The
capital stock of the company is \$10,000,000,
and the par value of the stock \$50. It is now
selling at \$7.

TRUTH ABOUT TIN AT HARNET PRK.
Onhunc — Jan 16 1891
WHAT THE OFFICIAL REPORT OF THE SOUTH
DAKOTA STATE MINE INSPECTOR SAYS.
From The Minn. City, S. D., News.

The first mine visited was the Corley. This is developed by an incline shaft sunk on the east side in company with the Sherman. From the Corley I entered the mine. An examination of the mine showed a vein, dipping at an angle of from 35 degrees to 45 degrees and intersected by a well-defined fault and having a width of 10 to 15 feet. The amount of lead ore was estimated at 100,000 tons. A letter was written to prove there was no lead in the Sherman Mine; I found the ore as I have described here in place. At the time I visited the property the company was getting down a new shaft. Everything in and about the mine, including all machinery, was

The Gerda is a very good prospect. It is developed by a tunnel and shaft. The shaft is 200 feet deep.

On February mine No. 3 a shaft has been run to a depth of 100 feet. The shaft is well timbered. The only machinery in a winch, used for hoisting.

On February No. 2, a vertical shaft, well timbered, has been sunk to a depth of 110 feet. Not the property look well and about are.

* I passed from the February group to the Addi group. This is developed by a shaft which has been sunk to a depth of 120 feet on date of my visit. The shaft is sunk on the ore ledge, white dip to a angle of from 60 degrees to 40 degrees. The ore was well defined, the lenses neither so good as the silver then according to be of uniform width. The Addi has passed that stage of development in which it could be called a prospect, and is regarded with a designated mine. The far continued development of the necessary machinery and of the latest improvements

NEVADA NINE.

When I visited the Nevada mine preparation were under way to erect new building works, while to my judgment, were badly needed. A vertical shaft has been sunk to a depth of 300 feet on the

The first specimen was collected by me near the mouth of the river in the old channel. The one I saw today was in the center of the old bed, which is thirty-four feet wide. The crosscut has been driven to show the extent of this great, ancient, unbroken, solid rock. In my opinion, neither ledge. On the leading edge of one of the crosscuts was found a two-foot section of gray ore, white, to all appearances good enough for use as fuel. It was found in the middle of the vein, and gives to it a very valuable character. This opinion was asked for, and was given to the satisfaction of all who were present.

HARVEY PEAK COMPANY.
The Harvey Peak Tin Mining, Milling and Manufacturing Company, to which the above first spotted of letters, owns some nine hundred the claims and fifty placer claims. It is not to be understood that all of these silver valuable ore, or that all of them ever will. Included in the number, however, are some excellent properties, notably the Hignald and

20

Following is a list of one wire pictures sold last night with the names of the purchasers and the prices paid:

- "St. Theresa," by Max; M. T. Chapman, \$175.
- "A Morning Call," by Jettie; O. Fletcher, \$925.
- "Evening at Barbizon," by Wiggins; George J. J. \$250.
- "The Brave," by Domino; Samuel P. Avery, Jr., \$150.
- "The Prisoned Butler," by Zammit; Samuel J. \$100.
- "Autumn," by J. W. Murphy; M. Kaeedler & Co., \$60.
- "The Fisherman's Daughter," by Iaceto; John N.

"The Wood Engraver," by Ulrich; A. Bartlett, 607
"Street Scene, Naples," by Fortuny and Feromudi
H. Wade, of Cleveland, 4536.
"The Guest," by De Kerville; H. A. Palmer, 81,
"Landscape," by Michel; Max Widman, 6225.
"Night," by Bogueron; A. J. Root, 86,000.
"Sunset at Nantucket," by Inness; T. A. B. Widen
of Philadelphia, 8000.
"A Wind Storm on the Plains at Alta," by Fremont
L. Crist Delmonico, \$2,700.

"*Le Malin du Gard,*" by Cath; J. Foxcroft C. #1,275.
 "Young Sappho," by Lerobero; M. Knedler & Co. #1,000.
 "In the Studio," by Deenst; Reichard & Co. #830.
 "The Palace," by Pastini; Jax Holman, #1,000.
 "Confidences," by Frank D. Millst; E. Hunt & Co. #1,000.
 "Sonet," by Wyant; William Whitting, #825.
 "Still Life," by Voltes; William S. Lafen, #1,400.
 "A Remond Ox," by Trosen; Samuel Untermyer, #1,000.

\$1,400.
"Moonlight in Virginia," by Iccasa; M. Knoodler
Co., \$350.
"The Falconer," by Jequet; L. Monisgrove, of Pa.
\$250.
"Always Tell the Truth," by Nicol; Franklin Mury
\$2,100.
"The Pension Agent," by Eamson Johnson; The
H. Clatsko, \$850.
"The Wedding Festival," by Isenby; the Corcoran
Galleries, of Washington. \$2,250.

[illegible]

"The Return from the Chaco," by Fremont; Montclair, N. J., \$3.00.
"In the Garden of Versailles," by Diodati; Sam-
uel, New York, \$1.00.
"The Dead," by Lovejoy; John J. Brown, \$1.50.
"The Veterans," by Knapp; M. Kussler & Co., \$1.60.
"Dreaming," by C. Y. Turner; James Phillips,

"Night in Flanders," by Cassin; William Demas
\$2.75.
"Charity," by Doughton; Rinehart & Co., \$1.125.
"Owls, by Trayan; Doubled, Valine & Co., \$4.0
"The First Kites of the Sun," by Gerstein; F. A.
Widener, of Philadelphia, \$4.00.
"The Rising Glow," by Ionta; W. O. Deming
\$0.25.
"The Contrabandist," by Schreyer; James Phillips,
\$2.00.

"The Hemlock Way," by Leland; Williams & Co. \$1,150.
 "The Old Witch," by Keweenaw; J. L. Aiken, \$12,000.
 "The Shipboard," by Jacques; L. Montaigne, of Paris \$1,700.
 "The Departure," by Stevens; M. Knoodler & Co. \$300.
 "In the Studio," by William M. Chase; M. Knoodler & Co. \$400.
 "The Image Seller," by Van Houten; M. Knoodler & Co. \$600.

Modern Miracles

THE MIRACLES AT LOURDES.

1892
A FAITHFUL CATHOLIC NARRATIVE OF
SINE APPEARANCES
N.Y. Sun — May 29
Is a Grotto That Was a Place of Refuge
for Laborers During Showers a Beauti-
ful Picture Was Seen by a Pennant Girl
Her Mory Was Not Halted as True,
but in Time Crowds Assembled. Was
How Prayed at the Entrance—Singing a
Miserable That Has Flowed Ever Since
Wonderful Cures Recorded—Fingering
from All Parts of the World—Thorough
Investigations Which Prove the Reality
of the Miracles Witnessed There.

This narrative of the eighteen appearances of the Blessed Virgin at Lourdes in 1858 and the miracles shown there and elsewhere since is from a charmingly written book of the distinguished French litterateur Henri Lavedan, which has been translated into twenty-two languages. It is a book of the same kind as the one which I have mentioned as being written by the same author as the most popular work of Dr. Dolezal, a French physician, entitled "Lourdes Illustrated (Médical)," which has up to this time run through eleven editions. A long notice of the book is given in the *Illustration* of the March number of the Catholic World. Henri Lavedan has written another book entitled "Episodes de Lourdes," which has been translated into

[illegible][illegible][illegible][illegible]

"fixed, with grave and
the sign of the cross,
that these had come
same. After rubbing
she was not dream
the five decades of
quarter of an hour,
the last "Glory be to
Holy Ghost," the sun

BEAUTIFUL, HE
Bernadette escaped
joined her companion
telling on her husband
of it, and had gone
She took them if
They were struck by
lies and emotion, she
net. She then said to
nothing I have nothing
to them what she be
promised to keep it to
the vision. They,
honor, could not com-
peated what they had
another, who shared
Unquestion that she m-
defusion, and positive
to the girls. When
"the Lady," she be-
humbled as certain in
for their clams, she
smile, and reply: "I
new idea of her. It
suspicion."

On the afternoon
Pernadette, with the
children, successfully
allow her to visit again
After standing at the

moments' prayer, one brought a pint bottle of brandy, as they had their share of the source of the Bernadotte to promise. On arriving at the grove its appearance had not occasioned rose had spreading branches, in the foot of the niche.

The other children in the class were surprised to hear that the water could be used to draw new power several times again.

edge of the alkali, has
 when the name of the
 deity prostrated herself
 on the ground, and
 ascription had vainly
 tried to time to get her
 noon being bright so
 many novices on the
 and around what they
 the behaviour of the
 news. The locality
 in their relation
 through of it others
 to the middle-class for
 their hands about
 cred to be "child
 process of learning
 Novak, simple, and
 both of them
 Lasserro would be
 have the ascription
 very that directed
 house, and they con
 coated to her to
 and what sin
 not. Her mother

Bernadette, has mother's perils. February, at 5:30 A. M. not even for the groto. At wado over, then up and down the yelled at the vir Bernadette moved groto a few morning down, began

[illegible]

Sunday, Feb. 24, of two or three other
baked her mother to
the Macanillo rocks.
March in tow for a few
some. "The woman
apparently if they
vials during the
"They may, I
others as well. I
Then she vanishes
phant supernatural

then party who had
it with holy water,
are about the holiness
partition, they asked
use the holy water,
they observed that
emerged, although an
from above and its
dog down as low as

When Bernadotte said, "On the day that there, and on the thousands, all realize that she was and is there. On the same what she asserted some persons let by professional ac-

...to put it in writing, to be compared with

40
 on Thursday, the 15th of
 April, after hearing many
 with her two companions,
 will attempt to go off
 to take a rugged and
 mountain side. They
 and agility with which
 alone. She reached the
 to inform them and con-
 vince the men. At first
 started with the brilliant
 she heard a voice which
 allured the apparition
 by a gesture of her hand
 as if to draw near. She
 two women, almost ex-
 posed, exposed and noticed.

[illegible][illegible][illegible][illegible]

3089

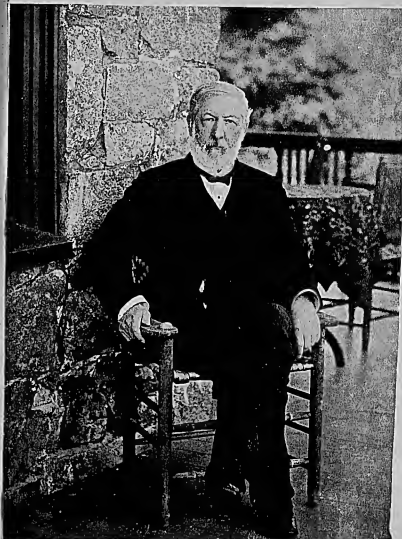
Passenger-List.
 S. S. "Neptun".
 Bergen to North-Cape
 22th—30th July 1892.

Captain: Mr. J. N. B. FOLKEDAL.
 First Officer: A. PAULSEN. Second Officer: P. T. CAPPELEN.
 Restaurant: TH. OLSEN.

Mr. Professor Dr. Ipsen. Kopenhagen.
 Mr. Generalant Holmblad. do.
 Mr. A. London Smøsten, Ensign Extraordinary and
 Minister Plenipotentiary of U. S. A.
 Mrs. A. London Smøsten. Alton.
 Mr. Adolant Max Lewi. Mainz am Rhein.
 Mr. Grosserer H. Madsen. — —
 Mrs. H. B. Morland.
 Miss A. H. Mansfort. Cincinnati Ohio, U. S. A.
 Miss M. M. Mansfort.
 Mr. Ch. Aug. Møppert, professeur de français (Ecole
 Madsen). Dresden.
 Mr. H. Gootz, Premierlieutenant. Dresden.
 Mr. Baron von Lilien. Berlin.
 Mr. von Tietzmann, Premierlieutenant. Berlin.
 Mr. Dr. Koch med Pnc. Berlin.

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Review of Review

HON. JAMES G. BLAINE, SECRETARY OF STATE.

June 1892

From the latest photograph of Mr. Blaine, taken at Bar Harbor last autumn by Mr. A. Von Mumm Schwartzenstein, Charge d'Affaires at Washington of the German Empire; now first published through the courtesy of Mr. Schwartzstein and Mr. W. E. Curtis.

Hr. Dr. S. Kistner. Leipzig.
 Hr. Dr. H. Kittenbüll. do.
 Hr. Rentier A. David med Fru og Barn. Paris.
 Hr. Rentier B. Mand med Fru. Maracilles.
 Hr. Rentier Dairou med Fru. do.
 Miss Mason. Virginia, U. S. A.
 Miss Carroll. Marglaud. —
 Miss O'Donnell. do. —
 Miss. General Arion. —
 Mall. Zsó Arion. —
 Mall. Marguerite Arion. —
 Mr. Rentier A. Datscher. —
 Mrs. A. Datscher. —
 Miss Emma Datscher. —
 Miss Rosa Datscher. —
 Mr. Rentier Alfred Davis. —
 Mrs. Alfred Davis. —
 Mr. Banker J. C. O'Connor. —
 Doctor Jean Louis Fauré. —
 Mlle. Jean Louis Fauré. —
 Mlle. Bourgeois. —
 Mlle. Bourgeois. —
 Hr. Antilland Orsahl. —
 Frøken Clara Orsahl. —
 Frøken Margrethe Orsahl. —
 Madame Van Nuffel. —
 Frøken Van Nuffel. —
 Hr. Dr. L. Dravin. —
 Hr. Marcel Dravin. —
 Hr. Dr. jur. Zoffé. —
 Hr. Rentier Dubqué. —
 Fru Snieder. —
 Frøken Snieder. —

Bucharest, Rumænien.

New York, U. S. A.

Dallas, U. S. A.

Paris.

Berlin.

Dresden.

Hr. Fabrikker P. Isck. Karlsruhe.
 Hr. Fabrikker Warner. Krimmlau.
 Frøken Warner. do.
 Hr. Landgerichtsdircktor Gross. Passau.
 Fru Landgerichtsdircktor Gross. do.
 Mrs. G. F. Shale. New York, U. S. A.
 Mr. A. F. Shale. do.
 Madame. Dr. Levi. —
 Hr. Lessor E. Levi. —
 Hr. Dr. jur. S. Levi. —
 Hr. Referendar Broger med Fru. Berlin.
 Hr. Banker G. H. Jans med Fru. New York, U. S. A.
 Mrs. Deane Cooper. St. Louis, U. S. A.
 Mr. F. K. Geiger. do.
 Hr. Karl Milsch. —
 Hr. Herrn. Milsch. —
 Hr. Vogtmeistrer Schmidt. Neuß am Rhein.
 Hr. Conrad Eder, Fabrikker. Berlin.
 Adll. C. de Lauch. —
 Monsieur de Lauch. —
 Mr. Langer E. Kittrolge. —
 Miss Kittrolge. —
 Miss Kittrolge. —
 Hr. Grosser H. Hansen med Fru. Charlottenborg.
 Frøken Stenogles. Wien.
 Hr. Adolbal Lionetor. Aiz.
 Hr. Grosser Leim. Kjøbenhavn.
 Hr. Professor Lorenz. Wien.
 Hr. Bogtrykker Führenholz. Berlin.
 Hr. Fabrikker Hecker. Berlin.
 Hr. Dr. jur. Georg Meislerff. Berlin.
 Hr. Fritz Adolstorff. Berlin.
 Mr. Oberst Christenst. London.
 Hr. Dr. Bismenfeld med Fru og Datter. Berlin.
 Miss L. Guldrey. Boston, U. S. A.
 Miss E. Dodge. do.
 Hr. Ludwig Andrich. Schmiedberg.
 Hr. Ernst Carl Schneider. Dargut. Russland.



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John B. Rogers

Rogers to Rogers

MURRAY BALLETIN

June 1892

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3094

3095

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3096

3097

Aug 26

N.Y. Tribune

1892

Electric Locomotive Experiment

In connection with the proposed underground railway in New York, the statement made by Alexander Graham, managing director of the great English firm of Siemens Brothers, in the weekly issue of "The Electrical World," in regard to the actual working of electric locomotives on the City and South London Underground Electric Railway in London, contains news of especial interest. Two of these Siemens electric locomotives of 100 horsepower capacity each, designed as "flexible" under widely varying conditions, which was specifically mentioned as 250 per cent. Each locomotive is equipped with two quarter motors and carries a speed which varies from twelve to thirty miles an hour with a horse power of 310 and 40 horsepower respectively. Each locomotive weighs about thirteen and one-half tons and draws a load of twenty-five tons exclusive of passenger. The City and South London road is proving to be successful financially. There has been an increase of 8 per cent in the gross receipts over a corresponding period of 1891 and a saving of 2 per cent in the expenses. The locomotives operated here have reduced from 10 to 12.5 cents per train mile, which compares favorably with the expense on the New England Avenue railway. The net per passenger has been reduced from 10 to 8.5 cents per locomotive.

7 sold
 8 the
 9 every
 10 take
 11 select

- 7000 50 COROT, JEAN BAPTISTE CAMILLE—A Fair
 at Toulon.
 8:50 60 DAUBIGNY, CHARLES FRANCOIS—Midday
 mer—Edge of a Pond.
 6500 61 FROMENTIN, EUGENE—Arab Falconer.
 4500 62 FAHNEY, L. G. H.—A Foto at the Hotel Rambot
 Hotel, Paris.
 26000 63 TROYON, CONSTANT—Drove of Cattle and
 Sheep.
 4700 64 DIAZ, N. de la PENA—A Clearing in the Forest,
 Fontainebleau.
 6400 65 FROMENTIN, EUGENE—Womans of the Oasis,
 Nuyt, Sahara.
 19500 66 GROMME, JEAN LEON—The Serpent Charmer.
 5000 67 SCHREYER, ADOLPHIE—The Advance Guard.
 20500 68 BRETTON, JULES—"Le Soir." 200

ORTOIRS & CO.
 Auctioneers.

AN EXERCISE IN CONSIDERATION.

Another thing. Our Democratic friends will not be slow to go to the aid of our country and get the first fruits of our progress and the first fruits of our progress. (Applause.)

We have no more words to say to you. We have no more words to say to you. (Applause.)

Now, there is another question. I want to speak about it, and that is the question. (Applause.)

Now, there is another question. I want to speak about it, and that is the question. (Applause.)

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price would
United States
it was likely
state by which
holding the
company had
if the laws
the welfare
of the United
States. Chi
the Edman
always been
it ought not
by law, been
so welfare
by the Circuit
ordinarily and
even, so that
the potent
therefore, which
the world
these, contain

taken from one packet.

for the carbon filament or for the glass of the lamp itself will be broken. Moreover, incandescent lamps are as yet a luxury, not a necessity, and therefore it will be for the interest of the owners of the patent to sell the lamps at a reasonable price, and thus to build up a large business. Should they pursue a different course, the only remedy will be the weight of public opinion, or a decree of the incandescent lamp trust for the benefit of the public.

End of Seven Years' Litigation Over the Little Lamp.

The electrical world is readjusting itself to the new conditions in which it was left by the recent decision in the incandescent-lamp suits. The decision was rendered by the United States Circuit Court of Appeals, a court established recently by Congress as an adjunct to the Supreme Court and to relieve that body of the accumulation of business. The suit was for infringement, and settled Edison's claims as an inventor as well as his patent rights, which, now, belong to the Edison Electric Co.

These rights are defined in the recent decision, which declared Edison to be the inventor of the incandescent lamp, but no one is to be denied the right of extending over 25 years, involving millions of dollars in capital, and almost without a precedent in the annals of patent litigation for complexity and importance. Hundreds of counsel, of course, are engaged, and the case has been investigated by the courts over the opportunity of the defendant and the experts without number. We give their testimony in regard to the questions at issue. It may occur the reader's mind have been led to suppose that lawyers and judges have been content to score on a variety of scientific knowledge before they have considered them, and the whole history of electric lighting has been traversed from its infancy. After all this vast labor the victory is given to Edison, and the right is assigned to him in time. He is declared by a majority of the highest judicial authority in the United States to be the inventor of the incandescent

But aside from the property interests in the patent the settlement of the electric-light contests in such an emphatic manner has been generally welcomed in the electrical world as the vindication of the claims of an inventor and a measure of tardy justice to a great discoverer. Although it has been again and again denied that Mr. Edison was the inventor of the incandescent electric lamp, it never has been denied that it was he who made the lamp a commercial success.

Prototypes 1880 Incandescent electric lamps had been made and would burn and which demonstrated that an electric current could be made to glow for a steady illumination. Many of these early lamps even bore a remarkable superficial resemblance to the little glass globes now familiar to everybody, and it was not long before Edison himself was the original discoverer of the principle, which was a familiar one to electrical experimenters before his first patents were taken out. The lights have shown, however, that Mr. Edison could give a thousand experiments with the incandescent lamp and secured nearly one hundred and fifty patents.

MADE BY A COMMERCIAL SUCCESS.

The principal patent obtained by Mr. Edison was for his incandescent lamp, which was first made in 1879 and was rewarded by the patent granted Jan. 27, 1880. It was at that time merely one of a large number of experimenting patents for an incandescent electric lamp, but it was quickly followed by others which were of great commercial success while all the others had been commercial failures. What he did there was to discover, not the essential scientific principle of electric lighting, but his invention was the first that was of any electric value and was the first to be of any commercial value and was the first to be of any commercial value.

Many of the earlier lamps of other inventors burned successfully for a matter of seconds. Then they would go out, and have to be replaced. The lamps of the General Electric were above that of gas, inside the tube of glass was a vacuum.

The lamp was tested for months, it glowed strong and steady illumination, and would be tested and operated in a cool, this rendered the lamp was not only a success, but it was demonstrated, however, before the company constructed of the lamp were lamps for use in a number of equipment, many of them were also sent out of business, and the company was able to produce the lamp. Company constructed to stop this robbery by money means that companies that they were making a lamp that was not only a success, but it was demonstrated, however, before the company constructed of the lamp were lamps for use in a number of equipment, many of them were also sent out of business, and the company was able to produce the lamp.

lighting rapidly expanded, the Edison Company brought suit against the infringers.

It took seven years to bring these suits to a successful termination, and in the case of the Edison Electric Light Company, the decision to have been almost and fortuitous of Mr. Edison's patent have been maintained and sold, and great sums of money have been diverted from the Federal Treasury, and the Edison Company would have been benefited the economic features of the Edison lamp. That manufactured by the United States Electric Lighting Company was made the first lamp in the case decided by Judge Thompson and the Edison Company was awarded an award and all the other Edison patents were lost and the stipulation except that of Jan. 27, 1890.

EDISON ADOPTED A NEW LAMP.

[illegible]

3126

to his faithful wife. In the evening, he returned to the house for a day or two. During this occupation, he was able to get some of his business affairs straightened out. He was very anxious to get away from the city, but he was unable to do so. He was very anxious to get away from the city, but he was unable to do so. He was very anxious to get away from the city, but he was unable to do so.

"The most important invention? Not me-
ses. Oh, there is no doubt that the Besse-
mer steel process is the most important, no
doubt whatever; and Bessemer did not know
any more about iron or steel when he was
undertaking his work than I did about elec-
tricity."

"When you did about electricity?" I in-
quired, with surprise.

1

gesture of boyish merriment. Whom he controlled himself he went on: "I said to myself, 'This bookkeeping business is all humbug; I don't believe in it. I'll keep my books hereafter in my hand.' And for a good while after that my bookkeeping was represented by two books which I put up alongside my desk. One of them was marked, 'What I Owe,' the other was

...at the moment Mr. Ellison's young child, a little girl perhaps of 5, with golden curls and fair blue eyes, is running up to her father and he knows some childish wish. He puts his hand softly upon her head, not at all as if he knew that she was over him. The recollections of the little girl extending for 10 years, and forming now when the life of the original patient is over.





Mr. Moxim tore a page from a notebook and let it drop to the ground. It fluttered, darted, dived, and fell to irregular places.

100 horse-power. With it I hope to get fifty or sixty miles an hour. The highest speed I look for under these conditions is about

used the lightest, best possible for the strain upon it, and as I propose going up myself in the first trip you can imagine I am not taking risks through weakness of the men in construction. The total weight of the ship with its full complement of men, guns, and three mules in it is something over 7,100 pounds. The boiler complete weighs 1,000 pounds. This small weight, considering that it gives me a force of 800 horse-power, is perhaps the most valuable portion of the work, since it is as always been known that we could fly if we could get a motive power of ade-

in a house eight feet long, five feet wide at the base, and about six feet high. The sides of the house were of thick earth with a few raw saplings, and the frame and top of the (blasted) iron. Within, viewed from a peep hole, the entire floor was a mass of small flames from 7,000 gas burners. Above, in this small space, were 1,000 pure copper heaters, each of which had a 100 watt iron heater, one-half inch in diameter and composed of hundreds of small tubes in thick rows—the remainder 50 inches in length and slightly greater in diameter and thickness. They were curved over and joined into a

"When will you take your first flight, Mr. Maxim?"

"I have no time," said Mr. Maxim, with the brown eyes thoughtfully on the future. "Haste, in such a venture, is the worst of policies. Weak points must be thoroughly sought for and everything made completely safe before the public is invited to consider the air ship as a practical means of travel."



KAUFEN, JOHN, *Genl. Manager Schenck & Co. works, General Electric Co., Schenckstad, New York.* Prepressors: Thos. A. Edison, John G. Handerson and Chas. Deitcher. Seedcater: J. G. Winship and Fredk. R. Philips. J. Born, May 1943, Switzerland. Tech. school, apprenticeship, drawing-room and shop experience in Switzerland 1860 to 1871; 1871 to 1881, foreman of machine department, Edison Laboratory; Genl. Manager Edison Tula works, 1881-1885. Supt. Edison Machine works 1885 to 1888. Genl. Manager of Edison & Genl. Elec. Companies, Schenckstad and Canada, to date.

3154

Royal and United States Mail Steamer
"CITY OF PARIS,"

Captain FREDERICK WATKINS, Lieut. R.N.R.

Director-STUART W. MILLER. Surgeon-T. T. REYNOLDS, M.
Chief Steward-THOMAS THOMPSON.

[illegible]

CONSULATE



The United States of America

Athens Greece.

TO ALL TO WHOM THESE PRESENTS SHALL COME GREETING:

Description.

Age 47 Years
 stature 5 feet 7 inches high
 build high
 Eyes brown
 Hair straight
 Nose regular
 Mouth brown
 Skin brown
 Complexion fair
 Teeth regular

The undersigned, Henry A. Marant
 of the United States of America

freely
 request of whom it may concern to permit
Charles Batchelor a Citizen of the
 United States with his wife and two daughters
 safely and freely to pass and in case of need
 to give them all lawful Aid and Protection.

Signature of the Consul.

Chas. Batchelor

Given under my hand and
 the Seal of the Consulate
 of the United States
 at Athens
 the 6th day of May
 in the year 1893 and of the
 Independence of the United States
 the one hundred twentieth.

Henry A. Marant



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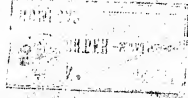
à Constantinople en France. Bon pour le

envoi à *Angoulême et Bayonne*

Paris, le 27 Avril 1893.

LE CONSUL GÉNÉRAL

Henri Pichon



Henri Pichon
Paris, le 27 Avril 1893.

Henri Pichon
Paris, le 27 Avril 1893.

Henri Pichon
Paris, le 27 Avril 1893.

Henri Pichon

to copy
BUREAU... 8/2/39
NO. 2712. LAFRECHES
BROCHURE

10

6/5/39

N° IMPOT
BUREAU - SERVICE
ROME CAP

6/5/39

His services as a member of many learned associations, including the geographical societies of America, Paris, Berlin and Italy. He was a Fellow of the Royal Geographical Society of London and was honored by the gift of the Grand Médaille d'Or of the Société de Géographie de Paris, and by the decorations of the order of the Croix du Mérite de l'Ordre de la Légion d'Honneur of the second class and the orders of the Médaille de la Croix de la Légion d'Honneur. He was also a deputy Lieutenant of the Gironde.

3158

Paintings

made by an Artist, with the Air Brush, are superior in pure tone, soft finish and pleasing effect. Air Brush paintings are of more value as works of art than any other. The public is beginning to realize this fact.

A word to the Progressive Artist is sufficient. Use the Air Brush made by

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3166

**Commander Cameron, the Famous
African Explorer, the Victim
of a Fall from His Horse.**

[BY CABLE TO THE HERALD.]
LONDON, March 27, 1894.—The distinguished
African explorer, Commander Verney Lovett
Casson, was fatally injured by being thrown
from a horse yesterday and died a little more
than three hours later. He was hunting with
Istern Hotchfield's stagbounds at Southbury,
in Hertfordshire, when his horse becoming un-
manageable, he lost his seat and fell heavily
to the ground. He was picked up insensible
and never regained consciousness.

THE PATH LIKE THAT OF SPICER'S.
The death of Cameron takes away
one more from the list of heroic men who began
the work of filling up the blank spaces on the
map of Africa over a century ago.
But for the rest of a century proceeding him
in discovering Livingstonia he would have
been a unique place in the history of African ex-
ploration. As it was he was the first European
traveler to cross the whole breadth of the African
continent in the central latitude beyond the
western shore of Lake Tanganyika to the Atlantic
Ocean. Cameron's mission was to take relief to
Livingstonia. On reaching Tanganyika, how-
ever, he found that the men he had undertaken
to succor were dead, and all he could do was to

COMMANDER V. LOVETT GARDNER, R. N., was one of the great missionary back to Africa days. He started on his journey of discovery in 1890, and after many years of hardship, which led him across the Dark Continent to the heart of the empire he held in his "Acres of Africa."

His death by accident while handling recoilless shot met Captain Speke, the African explorer, who had undergone even more memorable adventures than his own, and came to his end in a similarly sudden way. His homecoming was also so sudden as to attract the notice of the British Association, at which he was to have been the principal speaker, and on the day before the disaster went out shooting. In forcing his way through the dense forest he saw the lion's paw print in the mud, and he was caught in the trap. The lion's paw print was caught in the trap, and the lion's paw print was caught in the trap.

[illegible]

In connection with the late Sir H. H. D. Thorneycroft, in 1932 explored the country lying back of the gold coast and amongst the villages of the interior. In all between a natural belt of rain forest and the interior of the country. Commander Charnock received many hon- orific distinctions from the government and scientific societies of Europe and was the author of many books on the subject of the rain forest. It is to him that belongs the credit of being the first to point out a practical means of civilizing Africa by the formation of con- siderable communities for the construction of rail- ways and the development of the interior. The great lakes and rivers of the Dark Continent,

3167

"Waterproof Forge," Ed 10-1894.

Mr. George D. Burton, of Boston, before the American Institute of Philadelphia, last Wednesday, showed the method of heating by plunging the metal to be heated into a bucket of water and passing a strong current through it. The apparatus consisted of a large ordinary wooden bucket containing a large sheet of iron, one end of which was connected with an iron bar laid across the bucket forming the positive pole; the metal to be heated was held in the tongue, which were rested on this iron crosspiece and dipped into the liquid desired, thus avoiding all flexible connections with the battery. The negative pole was also held in the tongue and dipped into the liquid where he wanted to heat. In a few seconds, after which they were welded on an anvil with the hammer. In another experiment they were welded simply allowing them to fuse together. A large soldering iron was heated red hot in less than a minute. Pieces of iron were heated so redness to show that they were

The solution which he found to be the best, after a long series of experiments, is made of a solution of ten parts of carbonate of soda and one of borax, dissolved in water until the specific gravity at 70 degrees is 1.150. The current was taken from the street mains and at about 240 volts. It appears that no means of regulating the current were used, as the metal itself and the depth of immersion acted as the regulator. He claims to have made the first public exhibition as early as October of 1890.

3168

DEAR SIR :

An extended experience with the commercial applications of electricity, the machinery and apparatus employed therein, and the scientific principles upon which such apparatus is constructed and operated, will enable us to undertake advantageously to our clients, expert work in patent examinations or law suits, and to give consultations on the design, construction, or installation of electric machinery.

Our thoroughly equipped laboratory will enable us, not only to carry out physical investigations in connection with patents and technical processes, but also to calibrate and standardize electrical measuring instruments, and to make electrical tests or measurements generally.

Correspondence is solicited. Professional work will be undertaken in any part of the country. Telegraphic requests for consultation will receive prompt attention.

Yours respectfully,

EDWIN J. HOUSTON, Ph. D.
A. E. KENNELLY, F. R. A. S.

Thos. Batchelor Esq.

33 W. 25th St

New York City

HOUSTON AND KENNEDY—It will doubtless surprise many of our readers to learn that two gentlemen well known in the electrical field have determined to leave the organizations they have held for so long to their respective vocations. We allude to Edward E. Houston, president of the American Institute of Electrical Engineers, recently professor of physical geography and natural philosophy in the Central High School of St. Louis, Mo., which chair he has just resigned after holding it for the past twenty-six years; and A. C. Kennedy, president of the Vice presidents of the American Institute of Electrical Engineers, who during the past five years has been in Edison's right-hand man and chief electrician of the Edison laboratory. These



Feb 1890

[illegible]

3169

1894
PHOTOGRAPHY
518,190. Attachment for Operating Phonograph. Albert K. Koller, New York, N. Y., assignor, by mesne assignments, to the Automatic Phonograph Exhibition Company of New York. Filed Feb. 4, 1894.
518,191. Machine for Operating Phonographs. Albert K. Koller, New York, N. Y., assignor, by mesne assignments, to the Automatic Phonograph Exhibition Company of New York. Filed Feb. 4, 1894.
518,192. Machine or Attachment for Operating Phonographs. Albert K. Koller, New York, N. Y., assignor, by mesne assignments, to the Automatic Phonograph Exhibition Company of New York. Filed North H.
518,193. Attachment for Automatically Operating Phonographs. Frank W. Tappin, New York, N. Y., assignor. Filed March 8, 1894.

3170

HE IS A HUMAN PHONOGRAPH

M. Jaques Inaudi Performs Marvelous Feats of Mental Calculation.

AN ARITHMETICAL PRODIGY



IMAGINE a man with the impossible memory of a photograph, allied to the almost supernatural powers of a calculating machine that works with vertiginous rapidity—there you have Inouiti!

This young phenomenon—who is a veritable prodigy—is the latest addition to the long list of "lightning celebrities": a list which includes such names as Terry, Mangamele, Bidder, Gustave Basile, Bobbea, Henri Mondoux and Colburn.

Night after night the audiences at Koster & Blum's see the cot drop go up and find themselves confronted by two immense blackboards, perfectly blank. There are no other "properties." If one catches a little glimpse, with, struggling, an orchestra, connects the stage with the audience.


Introduced by the simple remark that this is "M. Jacques Tassili, the calculating wonder,"

IN HIS FURNACE. "I have created," says Israel, crossing his arms again. But his assistant is still talking away with a piece of cloth upon the blackboard. When he finally reaches the result—Israel reads the last of it. "Correct"—not interrogatively, but decisively, with the manner of one who would say, "I state a fact."

"Now Mr. Israel will make some calculations," says the other, and he sits at the name board. He is told the day of the week upon which any day was born if you will state the day of the month and year.

INAUDI IN 1992

into a name familiar to my ear. Indeed, my
correspondence has no part at all in my process of
translation. "Nino" conveys a distinct impressio
to my faculties, the figure of him to be transla
ted into the language of the English.

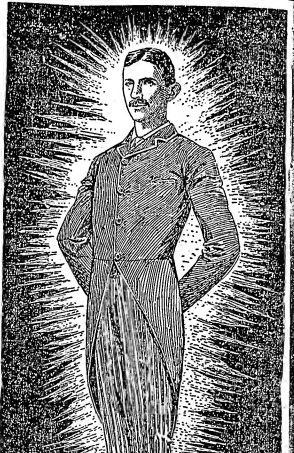
Hand  Incl 25

[illegible]

WHEN HE IS DOING SOME RAPID THINKING.

be
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le
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us
in

move your hand ten times in a second and then try to move it one hundred times to the second, it will take a hundred times as much strength to move it ten times as fast. The more times you swing twenty-five times to the second, require twenty-five thousand multiplied by twenty-five thousand times as much force as he would to move them once in a second. That makes him use up about six hundred million times as much force as you might think to move his wings like that." Mr. Deimichev's aged friend said: "Don't talk of such exertion in this weather," and wearily massaged himself out of the place.



"It is difficult for me," he said, "to give you an idea that you will readily grasp about this question of vibration. In ordinary life our minds do not deal with the figures that come up in such investigations, but take a 5 and put after it fourteen zeroes; then you will have the number of vibrations which occur in the ether every second and which produce

I carried out Mr. Tesla's suggestion, with the following result—500,000,000,000,000.

never was such a man for working out purely intellectual problems. Another said he could conceive of nothing more extraordinary than the devotion and admiration for Tesla entertained by all of the young electrical engineers. It is a pitiful thing for a morbidly conscientious writer to find himself becoming one 'not altogether worthy of his periods and clichés'; but I am certain in the case of Mr. Tesla that it is safe to go ahead.

END OF HIS DISCOVERIES.

Mr. Tesla discovered the rotating magnetic field. That seems to me, next to his idea of getting light by vibration, the best thing he ever did. The rotating

25

1

The Westinghouse Electric Light Company Must Keep Its Works

The property directly concerned was owned by the Weston Electric Light Company until 1908, when it was sold to the Weston Electric Company. Hereafter the advice of Professor Edward Weston, of Newark, was followed. The electric plant was organized as the Weston Company, the United States Company spent several hundred thousand dollars to acquire the plant to the Westinghouse Company. The Weston Company was given a four per cent interest on the stock for the first year, five per cent for the second and six per cent for the third year, and the Weston Company was given the right to purchase the stock of the Weston Company at the rate of \$1,500,000 for \$2,000,000, and George Westinghouse was given the right to purchase the stock of the Weston Company at the rate of \$1,500,000 for \$2,000,000.

The United States Company also sold to the Westinghouse Company its interest in the plant, and the Westinghouse Company was given the right to purchase the stock of the Weston Company at the rate of \$1,500,000 for \$2,000,000, and George Westinghouse was given the right to purchase the stock of the Weston Company at the rate of \$1,500,000 for \$2,000,000.

Now, according to the statements made by directors of the United States Company, not a dollar of the \$250,000 was paid, but the interest accrued upon these bonds was \$240,000, received from the sale of new stock and of merchandise, the United States Company having sold some of the machines, but there still remained a debt of \$10,000 to secure which a mortgage was given to three of the regions, Nevada, Hurley, Hyde and Stuts, This mortgage was made just before the issue of the bonds by the Williamson Company, and upon it the injunction was obtained, removal of the plant from Williamson by the latter company is asserted.

What reason is given for the proposed concentration of the Nevada plant in Nevada, Pa., is that it had been offered several times to the State, but a factory there by a hind syndicate.



On December 22, 1901, Isaac H. Maynard, by David H. Hill's orders, stole the true election return from the XVth Senate District; which resulted in making the Senate Democratic by fraud.

On January 19, 1892, Governor Flower, by David H. Hill's orders, rewarded Maynard by appointing him to a place on the bench of the Court of Appeals; and on December 26, 1892, reappointed him to that place.

On March 22, 1922, the Bar Association of New-

Judge Maynard is one of the gravest known to the law's adding: "if I were possible to consider Judge Maynard's action in the light of the facts in the case, in the heat of a violent political contest, or without opportunity for due deliberation, or in ignorance of the law, this case would present different features from those which it now presents. Judge Maynard has himself cut us off from that. He has made public proclamation of the fact that his decision to remove those returns was made with full knowledge of the facts, and that he took time for full deliberation; and that after mature and full consideration, he now accepts

On November 7, 1993, Isaac H. Mynard, the tool of David B. Hill in the theft of a State, was a candidate for election to the Court of Appeals, and was beaten by 101,000 votes.

On November 6, 1894, the people of the State of New-York defeated, repudiated and

condemned David B. Hill by 120,000
votes.

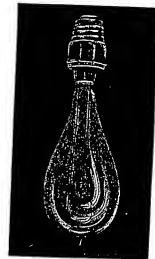
[illegible]

SACCHIS NEW SECRETARY.
The Rev. Dr. Frederick Hooker Said To Have
Been Appointed to Succeed Dr. Papi.
It was stated last night that the Rev. Dr. Frederick Hooker, vice rector of the American College in Rome, has been appointed secretary to Mgr. Nattoli, the Apostolic Delegate, to succeed the Rev. Dr. Hector Papi, who is to become a Jesuit.



VANIA ELECTRICAL ENGINEERING CO.

The accompanying illustration shows the new incandescent lamp now being manufactured by the Pennsylvania Electric



Another Non-Infringing Lamp.
Aug 1894
 Engleering Company, Penn Mutual Building, Philadelphia.
 This lamp differs from that heretofore manufactured by this company in that the "receiver" is not made entirely of glass, and hence does not come under the claims of the Edison lamp patent.

Acids $\xrightarrow{\text{H}^+}$ H^+

**Motion Heard for a Preliminary Injunction
to Restrain the Sale of His**

See 22 Monograph... 1894

the head of a company now putting the phonograph on the market for practical purposes were heard by Judge Leombo in the United States Circuit Court yesterday. The suit is brought by the American Graphophone Company and it is of such a character as to raise the question of infringement by Thomas A. Edison upon the peculiar form of recording cylinder used in the present phonograph, patented by C. A. Bell and Sumner Tainter.

There is probably at the present time \$10,000,000 invested in the micrograph industry.

YL. It involves a vast amount of money
while the status of the "Mexi-

He is the inventor of the present com-
munications system.

Indian laboratory was attached to play
ance river," but the occasion for
the song did not arise and the day was
passed. The morning after, and the day was
passed. The morning after, and the day was
passed.

and legal manipulation that has for you work in the respective inventors r.lawyers.

first patented an arrangement to reproduce sound, but it was of little value, because the foil was the surface on which the sound waves were recorded.

of the Bell and Talmater patents. In 1888, the realization of the dream of phono-jart. The cylinder then patented was Edison's last invention in a cylinder of

insoluble soap, upon which the blowing of sounds are reproduced. The Graphophone Company asserts to be the inventor of the new system, it is not

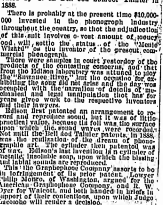
dears, of Washington, argued for the
in Graphophone Company, and R. W.
r Watson, and both handed in briefs in
of these contentions, upon which the

He will render a decision.

[illegible]

THE REV. DR. F. Z. ROOKER.

Albany, N. Y., and a nephew of William Rooker, of this city. He was born in Albany in 1861, and after attending the common schools, he returned to complete his education. He distinguished himself in the American College there, and was a favorite pupil of Mr. Sattell. He held a civil engineering diploma from the American as a graduate in the engineering department of the establishment of the University of the State of New York. He was in the army of the United States. Dr. Rooker was married in Albany on Monday, and the exact date of his arrival in New York is not known. It is probable that he will enter upon his new duties within a month.



A high-contrast, black and white photograph of a mechanical assembly, likely a mold or die. The assembly consists of several interconnected parts, including a large, dark, rectangular block on the right side, which appears to be a core or a plunger. To its left, there are various mechanical components, including what looks like a handle or a lever, and a series of smaller, rectangular blocks or inserts. The entire assembly is set against a light background, and the lighting creates strong shadows, emphasizing the three-dimensional nature of the components.

Bell, Telephone

(BY TELEGRAPH TO THE HERALD.)

The decision was a surprise in the street, and the stock responded sharply to the adverse ruling. A few knowing ones had sold stock on the chance of such a finding, however, and they were able today to buy it back at considerably lower prices. The general public received the decision as the last and proper outcome of the matter. The Bell company has the right of appeal in the United States Court of Appeals and it will probably avail itself of that privilege, and as it stands now the patents covering the fundamental principles of the telephone receiver and one general class of transmitters are void.

WHAT EFFECT WILL IT HAVE?

[illegible]

THE WHIRLPOOL RAPIDS AT NIAGARA
FROM THE CANTILEVER BRIDGE OF THE
MICHIGAN CENTRAL
"The Niagara Falls Route."

"At that time it was understood that the Bell Telephone Company believed that this patent

EMBARQUÉS SUR LE PAQUEBOT

DU HAVRE POUR NEW-YORK

Le 1^{er} Juillet 1893

500 ROOMS AND SITTING ROOMS

SPLENDIDLY FURNISHED

ELECTRIC LIGHT AND TELEPHONE IN EVERY ROOM

WITHOUT LEAVING THE STATION TRAVELLERS REACH THE APARTMENTS - LUGGAGE WHEELED DIRECT TO THE ROOMS

RATE OF THE ROOMS

RATE OF THE ROOMS	
SINGLE BED ROOM	From 4 francs
ROOM WITH A LARGE BED	6
ROOM WITH TWO BEDS	8

WINTER SEASON

BOARD: FROM 16 FR PER PERSON PER DAY INCLUDING LODGEMENT SERVICE LIGHTS MEALS, WINE INCLUDED

A CERTAIN TIME IN THE HOTEL.

17 "The patent of 1880 is for a transmitter for a speaking telephone. It is shown that one of the functions of the device shown in the patent of 1880—namely, the function of transmitting articulate speech, is identical with the sole object or function of the device covered by the patent of 1887, and that the device for effecting the transmission is identical in both patents. The patents, therefore, seem to me to be in violation of the provisions of the statute relating to the power of the Commission.

[illegible][illegible][illegible][illegible]

corated features which are necessary to the practical use of telephones. Investors refused to accept this view. They held that when Bell's basic patent expired, March 7, 1883, practical telephones not infringing on the Bellinger patent could be produced.

[illegible][illegible]

Charles Batchelor Scrapbook, Cat. 1246

This scrapbook covers the period 1892-1900, with one additional item from 1909, and contains clippings about a variety of subjects. Included are newspaper interviews and profiles of Edison and his son, Thomas A. Edison, Jr. There are also clippings about Edison's kinetoscope and his plans for combining that invention with the phonograph; litigation involving Edison and the North American Phonograph Co.; Edison's relations with the General Electric Co.; and his iron ore concentration plant at Ogden, New Jersey. Other items pertain to aerial navigation; bicycles and the invention of the bicycle speedometer; x-ray experiments; and new uses for the automobile. Additional clippings relate to Nikola Tesla; the accidental death by electrocution of Franklin L. Pope, inventor and editor of *The Telegrapher*; the international competition for the "world's fastest train"; and organizational changes at Drexel, Morgan & Co. Also included are advertisements from incandescent lamp manufacturers; passenger lists from transatlantic crossings; and invitations to meetings of professional societies and to social events. The spine is labeled "1895-1896" and "H 3204 to .". The pages are unnumbered. Approximately 150 pages have been used. The clippings are individually numbered 3203-3539.

INNESS PICTURES SOLD AT AUCTION

The following are the works sold, the names of some of the buyers and the prices realized:-

The following are the works sold, the names of many of the buyers and the prices realized:

1. *History of the United States*, by George Catlin, 1845, 1846, 1847, 1848, 1849, 1850, 1851, 1852, 1853, 1854, 1855, 1856, 1857, 1858, 1859, 1860, 1861, 1862, 1863, 1864, 1865, 1866, 1867, 1868, 1869, 1870, 1871, 1872, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 252

101.	102.	103.	104.	105.	106.	107.	108.	109.	110.	111.	112.	113.	114.	115.	116.	117.	118.	119.	120.	121.	122.	123.	124.	125.	126.	127.	128.	129.	130.	131.	132.	133.	134.	135.	136.	137.	138.	139.	140.	141.	142.	143.	144.	145.	146.	147.	148.	149.	150.	151.	152.	153.	154.	155.	156.	157.	158.	159.	160.	161.	162.	163.	164.	165.	166.	167.	168.	169.	170.	171.	172.	173.	174.	175.	176.	177.	178.	179.	180.	181.	182.	183.	184.	185.	186.	187.	188.	189.	190.	191.	192.	193.	194.	195.	196.	197.	198.	199.	200.	201.	202.	203.	204.	205.	206.	207.	208.	209.	210.	211.	212.	213.	214.	215.	216.	217.	218.	219.	220.	221.	222.	223.	224.	225.	226.	227.	228.	229.	230.	231.	232.	233.	234.	235.	236.	237.	238.	239.	240.	241.	242.	243.	244.	245.	246.	247.	248.	249.	250.	251.	252.	253.	254.	255.	256.	257.	258.	259.	260.	261.	262.	263.	264.	265.	266.	267.	268.	269.	270.	271.	272.	273.	274.	275.	276.	277.	278.	279.	280.	281.	282.	283.	284.	285.	286.	287.	288.	289.	290.	291.	292.	293.	294.	295.	296.	297.	298.	299.	300.	301.	302.	303.	304.	305.	306.	307.	308.	309.	310.	311.	312.	313.	314.	315.	316.	317.	318.	319.	320.	321.	322.	323.	324.	325.	326.	327.	328.	329.	330.	331.	332.	333.	334.	335.	336.	337.	338.	339.	340.	341.	342.	343.	344.	345.	346.	347.	348.	349.	350.	351.	352.	353.	354.	355.	356.	357.	358.	359.	360.	361.	362.	363.	364.	365.	366.	367.	368.	369.	370.	371.	372.	373.	374.	375.	376.	377.	378.	379.	380.	381.	382.	383.	384.	385.	386.	387.	388.	389.	390.	391.	392.	393.	394.	395.	396.	397.	398.	399.	400.	401.	402.	403.	404.	405.	406.	407.	408.	409.	410.	411.	412.	413.	414.	415.	416.	417.	418.	419.	420.	421.	422.	423.	424.	425.	426.	427.	428.	429.	430.	431.	432.	433.	434.	435.	436.	437.	438.	439.	440.	441.	442.	443.	444.	445.	446.	447.	448.	449.	450.	451.	452.	453.	454.	455.	456.	457.	458.	459.	460.	461.	462.	463.	464.	465.	466.	467.	468.	469.	470.	471.	472.	473.	474.	475.	476.	477.	478.	479.	480.	481.	482.	483.	484.	485.	486.	487.	488.	489.	490.	491.	492.	493.	494.	495.	496.	497.	498.	499.	500.	501.	502.	503.	504.	505.	506.	507.	508.	509.	510.	511.	512.	513.	514.	515.	516.	517.	518.	519.	520.	521.	522.	523.	524.	525.	526.	527.	528.	529.	530.	531.	532.	533.	534.	535.	536.	537.	538.	539.	540.	541.	542.	543.	544.	545.	546.	547.	548.	549.	550.	551.	552.	553.	554.
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Feb 13 14 15 - 1875

* 3229

✓ Testa Herald. Mch 14 1895

[illegible]

Nicott Trade came into the country about ten years ago. It was a very successful business, and the name was already well known. It was a very successful business, and the name was already well known. It was a very successful business, and the name was already well known.

3225

1895

Following were the principal prices:

[illegible]

3227

THE NEW ELEMENT IN THE AIR.

[illegible]

Arden. x 3226

N HAS HIS EYE ON ARGON.

August 1936
Lutpelt shows that there's something
Air Heedless Nitrogen and Oxygen
A. H. Hilton has recently been reading
argon, the newly discovered gaseous com-
of the atmosphere, and on the experi-
Laurd Mayhew and others abroad.
Monday that he intended to do some
himself as soon as he could get
it. "That will probably not be before
summer," he added, "as I am still ven-
in my mining operations. I do not know
investigation into the nature of argon
has been made in this country, and the
criticisms will soon be many, and I will
I will look for argon, and it will only
in looking for it they will find other
in the atmosphere.
discovery of argon is a fresh evidence
little we really know. Here is a con-
evidence is that the atmosphere is a com-

These prizes, according to Prof. Langley of the Smithsonian, were intended to be given to the

person or persons whose essays contributed to our general knowledge of the nature and properties of atmospheric air, so that practical ap-

Lord Heydreich and Prof. Henneay have submitted to the Smithsonian Institution a bronze medal of the 100th anniversary of the birth of Darwin, of the value of \$10.00. No official information as to the award of the medal by the Institution has yet been obtained for the reason that a judgment has not yet been made by the Institution as to whether or not the medal is of a high artistic value. It is only known here for a short time; but it is said that this essay will fall well within the requirements of the medal which is to be awarded to the artist who fulfills the conditions of the first prize. The medal is to be awarded to the artist by the Academy of Sciences of the Republic of Poland, and the Committee of Judgment on the part of the Smithsonian Institution is composed of the Secretary of the Smithsonian Institution, and the members of the American Association of Academies of Science, and was by the President pro tempore of the American Association for the Advancement of Science, Prof. C. D. Minot, who will act, together with Prof. S. P. Langley, Secretary of the American Association of Academies of Science, as the Committee of Judgment. To this committee will be a member ex officio. To this committee are

APC, 1895

322-9

BELL'S GREAT RIVAL.

Enormous Capital and Political Influence Combined in a New Telephone Company.

WILL COVER THE COUNTRY.

Three Hundred and Sixty Million Dollars Now Invested in the

The Organization.

PROMOTORS KEPT VERY QUIET.

Doubtful if Even the Bell Company Has Keen What the Organizers Were Doing.

NEW YORK, N. Y., April 1, 1915.—The most extraordinary combination of capital and political influence ever put together has been announced to enter the telephone field and rival the Bell company by a faster, cheaper, and, it is declared, better telephone.

The new enterprise is headed by the Pierce Trust, the Standard Oil Company, the two weekly weekly Greater business of Cleveland and the Tribune company interest, who also among the men who are the most powerful in the country.

Franklin who is the capital is a bar of political, who also among the most powerful in the country. Among the men who are the most powerful in the country are the Standard Oil Company, the two weekly weekly Greater business of Cleveland and the Tribune company interest, who also among the men who are the most powerful in the country.

The entire country, as far west as the Mississippi River, has been promised out and placed in the hands of local companies, each of which is organized along their domestic lines of operation. The complete capital invested in the country, the amount of capital interest concentrated is hardly conceivable. It is such in size, however, that it is enough to make the Standard Oil Company a great deal better.

The company is known as the Standard Telephone Company of New York. The standard telephone is the most modern of the type, and the telephone of this system, as the Pierce Trust has the Standard Oil Company, the two weekly weekly Greater business of Cleveland and the Tribune company interest, who also among the men who are the most powerful in the country.

The Standard Telephone Company of New York, the Standard Oil Company, the two weekly weekly Greater business of Cleveland and the Tribune company interest, who also among the men who are the most powerful in the country.

Not the best telephone system could this country maintain in the country, and which would be the most modern of the type, and the telephone of this system, as the Pierce Trust has the Standard Oil Company, the two weekly weekly Greater business of Cleveland and the Tribune company interest, who also among the men who are the most powerful in the country.

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consequence can easily be carried on between New York and San Francisco. Another advantage claimed for the enterprise, and, lower, the capital is taken. The Standard Telephone Company of New York, the Standard Oil Company, the two weekly weekly Greater business of Cleveland and the Tribune company interest, who also among the men who are the most powerful in the country.

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ELECTRICITY ON CANALS.

The Official Test of Propelling Boats by Lamb's Method on Unusually Good Success.

NEW YORK, N. Y., Oct. 2, 1915.

The official test of Richard Lamb's method of propelling boats by electricity was conducted on the Erie Canal in Pennsylvania, the afternoon and was an unusual success. The test was conducted on the Erie Canal in Pennsylvania, the afternoon and was an unusual success.

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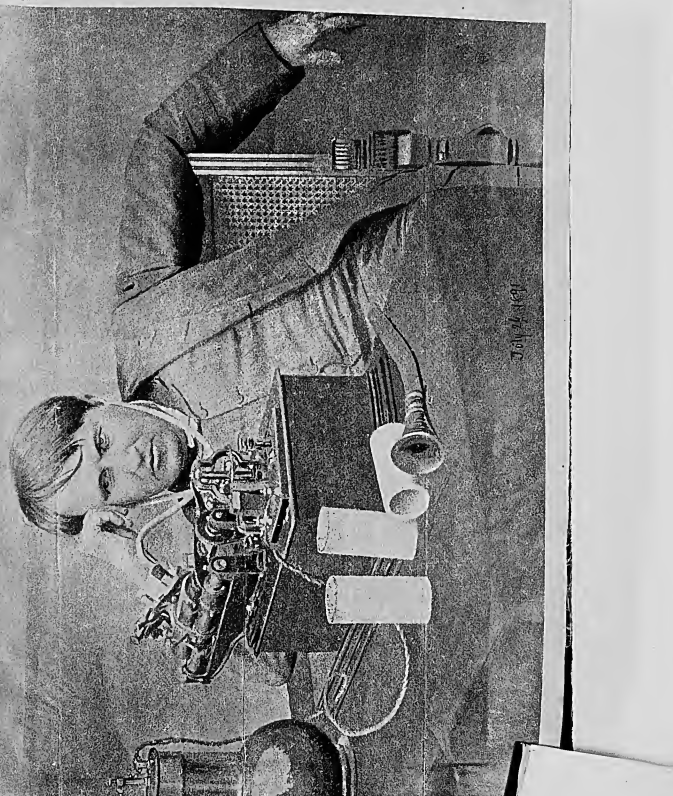
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322-1



DU HAVRE POUR NEW-YORK

19. 10. 1961. 18100

RÉCAPITULATION

bays. Signed — Inverse.

OFFICIERS DU PAQUEBOT " LA CHAMPAGNE "

LAWRENCE, Commandant			
M. JAGUENAU,	Second Captain	M. LORIEUX,	Chief Mechanician
M. DANEZ,	1 st Lieutenant	M. LEHIEU,	" "
M. DECOU,	" "	M. SAOULANET,	" "
M. DUMPEL,	" "	M. LE PENNEU,	1 st "
Commissaire, M. COMTEZANT		Sous-Commissaire, M. SCHUMMEIKER	

Molnar, M. DE KALCOFFER

An Important Mining Deal

Consummated. 1895
Olive Mercuri Wch 25
The Morris Ravine Mine Now Under
Control of English Capitalists.

Details of the Transfer Whereby Oraville Will Have One of the Largest Drift Mines in the State—Golden in Name and Golden in Reality.

A great mining deal has just become public, whereby the famous old Morris Ravine mining property, formerly owned by Secretary of State Hendricks, Thos. H. Hendricks, J. C. New and a company of Indiana capitalists, passes into the hands of a company of English mining men, having been floated in London last week.

The old Morris Ravine mine, or, as it is now named, the Golden Butterfly, which was formerly worked by hydraulic process, consists of 1200 acres of patented land, and is probably the largest min-

ing claim in the United States under one patent. It is situated about four miles above Oroville, just where the ravine of the same name cuts between the north and south Table Mountain.

In the pulpy days of hydraulic mining, Morris Ravine was the scene of great activity. Through there in prehistoric days, ran a mighty river, wash-

ing down for centuries, the rich gold-bearing gravels of the Sierras and depositing them in a channel of great width. There came a terrible upheaval to destroy what the form of the earth-

of nature in which the face of the earth was changed. Lava poured down, obliterated the river, Table Mountain was burned and no man can tell exactly what stupendous changes were effected.

The hardy miners of early days found traces of this mighty channel and proflited greatly thereby, for the richest placers ever worked in California were

undoubtedly fed by this same old channel and were at Morris Ravine. Thousands of men took out millions of dollars, until the time when the placer mining exhausted the surface and the era of

After the Hendricks company acquired possession of this vast body of land, they spent between \$400,000 and

\$500,000 to perfect the title, to build ditches and bring in a water supply that would be inexhaustible and sufficient to mine the property by extensive hy-

The mine paid—paid almost fabulously, but misfortune seemed to follow the efforts of the Hemricks company. In its unmiest days, when its richness

was just becoming known, a great slide of such stupendous nature, carried down a portion of the mountain, covered the pipe lines and sluices and there was not

sufficient water to pipe on the shore. Before arrangements for reopening could be made, came the debris infestations,

followed by litigation, and on the death of both W. C. Hendricks and T. H. Hendricks, the property went to the creditors, the principal of whom was Senator Geo. C. Perkins.

The interests of the creditors were consolidated and placed in the charge of a Board of Trustees, who made the present deal with Major Frank McLaughlin, through their agent, Milton J. Gross.

It may be stated in this connection, as showing the high standing with which Major McLaughlin is held in the financial circles of the Old World, that in less than a month after the property passed under his control, that he had floated it in London through his associates there, the company was formed and cablegrams sent him to commence operations at once, under the name of the Golden Butterfly Mining

Major McLaughlin's ability to open and work the mine successfully is due, in the main, to his absolute control of the extensive water rights of that section, among which are the Mueveno ditch and the Hendricks system of canals. Without these water rights

Columns of facts and figures might be quoted to prove the undiminished richness of the property. The richness of Morris Ravine, which was felt by the old channel, is known to every early miner, but the most conclusive proof is in the actual working of the ground itself by the hydraulic process, and the wealth uncovered in the celebrated Spring Valley Gold company at Cherokee, where it is estimated that \$15,000,000 in gold was added to the world's supply of

The Spring Valley lies to the north of the lava capped Table Mountain, and where the channel was not protected by the lava, has still great amount of gold been taken from the old channel. It was mined by the largest hydraulic system in the world until the lava cap forbade further mining on account of great

The plan of operations is to reach the channel by a tunnel and open up the mine for drifting. What this means to labor may be arrived at when we say that it was estimated by experts that

the old Cherokee channel, if thoroughly
opened by tunnel and worked by drift,

August 31, 1895 (37) *The Churchman*
 to section of steams in London brought

about \$8,000 in two days. Thirty dollars were paid for a red French stamp on one frame; \$55 for an unused English V. R. stamp; \$65 for a Moldavian stamp of fifty four paras, blue on a green ground. Au

other Moharlan stamp of 100 paras, orange pink, brought \$155; a Spanish stamp of two reals, orange, \$185; three black ten-cent St. Louis stamps of different im-
pressions, \$375.

would give employment to 500 picks. The Golden Butterfly will do as much, if not more.

The actual work on this new and important enterprise commences today. Ere this article was in type contracts had been let for building boarding houses, blacksmith shops, tool houses, a dwelling for the superintendent and other necessary buildings to accommodate the many miners who will be em-

ployed. A wagon road will be constructed, several miles in length, from the Golden Feather road, and a telephone line run to Major McLaughlin's office from the mine. In fact, all the accompanying improvements of a grant mining development scheme will be at once completed.

As before stated, the Golden Butterfly is incorporated in London, and takes its title from the world famous novel of Walter Besant of the same name. The luck and fortune attendant upon the "Golden Butterfly," as detailed by this famous writer are proverbial, and it is fitting that a mine, known to be so rich should thus be named.

The Golden Buttery will be under the direct management of Major McLaughlin, and the other local officers are Stephen P. Moody, superintendent, who is acknowledged to be one of the most expert drift miners in California, and in whose ability Major McLaughlin has unbounded confidence. Mr. George F. Gause is associated with the Major in the enterprise. The secretary of the company is H. W. Smith, and we are pleased to learn that our young townsman, A. J. Walsh, has been appointed bookkeeper.

The development means much to Oroville and will open up a new era of prosperity in the old ravine, where, in days gone by, there was so much

It emphasizes in a remarkable degree the confidence with which Butte's foremost citizen is held in the financial circles of London. Major McLaughlin's recent successes in adjudicating transactions, notably the outcome of the Banner mine at Tuble Mountain, which, after years of abandonment, was being put on a paying basis extremely satisfactory to the owners and flattering to his judgment and ability as a mining man, together with the very favorable prospects of the Golden Feather river mine, which will be opened this season on a more extensive scale than ever before, serves to cause renewed admiration in our people for a man whose ability and enterprise is thus acknowledged and shared in by the leading financiers of the world's great

August 31, 1895 (37)
The Churchman

An auction of stamps in London brought about \$8,000 in two days. Thirty dollars were paid for a red French stamp of one franc; \$55 for an unused English V. R. stamp; \$65 for a Moldavian stamp of fifty-four paras, blue on a green ground. Another Moldavian stamp of 108 paras, blue on pink, brought \$175; a Spanish stamp of two reales, uncancel, \$115; three black Senegal St. Louis stamps of different denominations, \$375.

tion was as usual as for inappreciable without elaborate calculations." This was the nitrogen according to the author's knowledge. Prof. H. N. McCoy read his paper on the nitrogenous qualities:

"Long-continued passage of the electric spark between the platinum wires of the diathermometer in which was a mixture of the gas with pure hydrogen, produced a marked rise in temperature, a few drops of water being introduced above the mixture before turning on the current gave the battery better tested with diathermometer and bromine, likewise, a small quantity of water being added to the gas, the temperature rose a little. The paper turned red at it. When the terminal of a Daniell cell was connected to a simple modification of the diathermometer tube, devised for the measurement of small quantities of gas containing a mixture of the gas with three volumes of electrohydrogen, a slow contraction of the gas was observed, and the gas was found to be split as formed

could be removed by water or an acid. A strip of mudstone red limonite paper was suspended in the apparatus and the apparatus was placed in a beaker of water. During alkaline reaction with limonite, bubbles affording with Newell's reagent the characteristic ammoniacal odor were evolved. Mr. Hillbrand found on such a test it became as evident to the type as to the event that he had obtained nitrogen.

By the method Mr. Hillbrand used on English chromite can obtain nitrogen from either granulite or any other mineral, the difference being that the former will give off or will be composed of rare-earths. Had he gone on with his experiments he would infallibly have discovered the nitrogenous nature of the shale type have discovered limonite. As it is he has the honor of having made a mistake which furnished a hint to the world.

founder, did not see the false structure of alchemy lead to the true science of chemistry? Nay, let profane to say that it was the error of the young man, the wildness of his imagination, the young child was. So Mr. Hillebrand, though he did not know the ritual, and had refused it himself, had been misled by the very person who had married him to the view to that he was guilty.

There came again, at all events, in trying to unravel some of another. By all elements of the world is laid out before him, and he is being rare it had been little examined. Cleveite is called after Prof. Cleve, and is found almost exclusively, I believe, at Arcturum, in Norway. It is called in the German literature, and is (or to be more accurate if more familiar) like platinum in a yellow colour. It is not unlike lead, but is harder, more brittle, and more soluble in the acids. Its natural colour is not only gray, but bluish.

The process of extraction is singularly itself, and the fact is that it is a very rare element.

and the other is that it is a weak acid and dilute sulfuric acid, and it yields two and a half per cent. of its weight in gas. The gas being hydrogen and the acid being sulfuric acid, it is, of course, in the presence of alkali, turned out to be a mixture of argon with something else—a something which was not hydrogen. The hydrogen sulfate (yellow) had never been observed of anything terrestrial before.

Prof. Crookes was forthwith questioned. He went into the matter very carefully; and he in a good manner, as usual a spectroscopist as you will find. He pronounced the gas which was obtained in the experiment to be the case made by almost the entire external portion of the sun's atmosphere, the portion higher than the sun's surface, and which is composed of either hydrogen, or sodium; the strata in the photosphere or chromosphere—call it what you please.

Norbert Lockyer: What says he? Is bellum? Thinkst thou he will answer off the top of his head? I think not. He is content to say that the yellow line is something extraordinary; very extraordinary; very mysterious; very unaccountable; and whereas again before he lends it to us for the purpose of identification, if it be not too late to say so, his sign about helium is He's all right; you know him, but you've got to know his tale.

Mr. Curran, the great French savant, is undecided. Agreeing with Prof. Crookes, he says that the yellow line is "the most important solar spectrum." And that is absolutely all we have about helium yet.

The difficulty of getting it is not to be difficult to obtain for as many experiments as even the best

[illegible]

8. H. H.

PARIS, April 19.—The interest taken by French savants in the discoveries of argon and helium

3284
THE AIR'S NEW
Sun Sep 8 1884
POINTS ABOUT ARGON
LUM NOT YET

Results of the Latest Experiments—New Elements—Both Ethers—The Latest News

The present state of knowledge to argon and helium is summarized by Prof. Ramsay, J. N. and W. Travers, which is in the *Journal of the Chemical Society*.

"Helium, a Constituent of Certain Ethers"

"It cannot be doubted," the authors say, "that the same analogy exists between argon and helium as between both rosette sparking with oxygen and red-hot magnesium, and, if we

"Inference from the ratio between heats at constant volume pressures, both are monatomic gases, and undoubtedly place the chemical class and differentiates known elements."

The ratio of specific heats, volume and that at constant pressure in the molecules being that is so, if a molecule contains only one atom, the ratio of the molecular weight must be the same, and as the molecular weight is twice the density, it follows that the atomic weight of helium is 4.00.

however, in making this calomum is a single element, and elements. Whether this has been proved for helium. What is derived from the properties. It is known that the molecules of the compounds of carbon and increase in molecular weight as rise in the boiling point, and that a complex molecule has point than the simpler molecules is formed. Thus a proof that none is complex is supplied by boils at a higher temperature to boiling point of argon is 187

nitrogen and oxygen; if argon is present in more than one atom its boiling point will be lower than one atom nitrogen or oxygen, but it strengthens the molecular monatomicity; from the calculated valence also in helium, and H atomic weight of helium is 4.0.

An answer to the question, "how occurs in the air and hydrogen gas why is not helium green?" by Dr. Johannes Stouy seems to argue that if hydrogen were escaping combination with oxygen virtue of its own molecular weight nor planned, and he

celestial body having since attraction to hold it fast. counts for the absence of an water vapor in the moon, and of an atmosphere of hydrogen would also account for the absence of an atmosphere and for the presence in the solar spectrum. Of meet can form compounds or be solid, as helium seems to be like hydrogen and helium on the existence to a free state. An atmosphere because it forms. Similarly, nitrogen is common.

monophenols to form the dimeric compounds are comparatively rare. Its compounds are usually dyes. The excess of nitrogen therefore free state. No free oxygen is maintained after all the oxidations have combined with oxygen with as fewertness similar to may be looked for in the etc.

The great difficulty with organic is that it does not exactly fit the table of atomic weights, which foundation atoms of moderate density is too high; to fill the between chlorides and potassium iodide of 20, and the atomic

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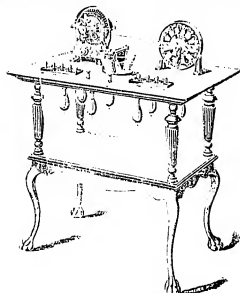
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The Kennelly Therapeutic Sinusoidal Machine.



Price, Complete, \$30.00

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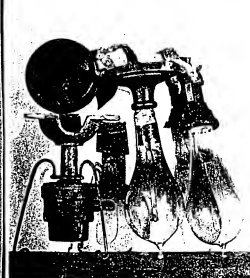
NEW YORK CITY

Ex-100 : Orange, N.J.

FOR SALE BY

minors were operated continuously from dark until 10:30 o'clock each night during the fifteen years the plant has been in operation. The plant was installed in the early part of 1880, and on the 2d of May in that year the dynamo was first started.

In the light of present practices and beliefs it seems impossible that the wiring of this pioneer equipment should have been in use for fifteen years on shipboard exposed to dampness and other possibilities of injury.

[illegible][illegible]

The independent electric lighting plant on the Columbia proved a source of wonderment, not only on the Pacific Coast, but at every port at which the vessel stopped on her voyage around the Horn. Through Mr. R. C. Co's interests, it was arranged that the vessel should stop at every principal port and give exhibitions of the apparatus. The engineers of the Columbia who have been in the service of the plant since it was built, stated that the number of the paper coils varied from 100 to 150, and that the length of the trip to the Pacific Coast, and that the replacing of burned out lamps became unaccountably frequent. Upon arriving on the Coast, however, a new method of lighting was adopted, and the use of the paper filaments were used; these gave much better satisfaction and many of them, it is stated, have a record of 5000 hours, while some have burned 9000 hours, and a very few lamps of them were seldom used were still burning when the electric light plant was dismantled.

In addition to the lucidescence plant, the Columbia was provided with a 2000 c. p. power search light operated by a small Siemens' vertical type dynamo with von Heffner Alteneck drum armature. The vessel, when refitted, will be provided with a 400-light Siemens-Halske generator, direct connected to a triple expansion marine type Union Iron Works engine.

3296

[illegible]

DESCRIPTION.

This little alternator (shown in cut on top of table on right) is intended for the production of sinusoidal alternating currents in electro-therapeutic treatment. It is driven by a small motor running on the Edison direct 100 volt current (shown on left.) The field frame is of laminated iron supported by castings, and has twelve poles. On each pole is a spot with two windings of wire. The inner, has eight layers of fine wire, and the outer, two layers of coarse.

All the fine wire windings are connected in one series, which constitutes the secondary or delivery coil. All the coarse wire windings are connected in another series, forming the primary or field winding of the machine. By this arrangement it is only necessary to drive the armature, which is a combination of laminated iron disks, to transform the continuous primary current into alternating current waves in the secondary circuit, and by duly proportioning the grooves and projections on the armature surface, these waves are made

Twenty-four alternations or twelve complete periods are generated for every revolution of the armature, and since a speed of 4,800 revolutions per minute can be attained, the frequency can be carried to 1920 alternations per second or over 115,000 alternations per minute. For starting at a more moderate speed and frequency will usually be desirable.

The primary winding of the alternator is excited by the 120 volt direct current, which is controlled by a lamp rheostat, the switchboard operating some being shown in the front of cut on the right and the lamps being placed under the table. In this way the strength of the secondary currents can be controlled independently of the frequency.

The speed of the motor, and consequently the number of alternations of the secondary currents, can be varied by the lamp rheostat shown in the front of cut on the left, as this rheostat is included in the motor circuit.

The relay Rheostat shown in the centre of the table is connected in shunt with the secondary circuit, and is used to vary the strength of the current applied to the patient.

TO PUT THE OUTFIT IN OPERATION

Screw the attachment plug, at one end of the connecting cord,

into the keyed socket at the back of the table underneath the top, and the attachment plug, at the other end of the cord, into any stationary socket connecting with the electric light mains. Turn the key in the socket that the attachment plug is screwed into, so as to bring the current into the instruments.

TO START THE MOTOR

Throw on one or more of the switches on the switchboard in front of the motor. This will start the motor and the speed is increased by throwing on the remaining switches.

TO CONNECT THE BAILEY RHEOSTAT.

Fill the glass receptacle to within one inch from the top with water, and attach the two pin connections on the green ends (coming through the table) to the two binding posts at the rear ends of the horizontal rods carrying the carbon leaves, and the rheostat is now properly connected.

TO EXCITE THE ALTERNATOR

Throw on one of the switches on the switchboard in front of the alternator. If more intensity of current is required, throw on the remaining switches, one at a time.

TO USE THE SECONDARY CURRENT

Connect the sponge electrodes to the two binding posts in front of the table, and start the motor and alternator. Bring the leaves of the Bailey Rheostat close together, before applying the sponges to the patient. Then gradually turn the milled head screw, so as to separate the carbon leaves, until the requisite amount of current is attained.

When the carbon leaves are both close together, almost the entire current passes through them, and consequently the current passing through the patient is very small.

As the leaves are gradually separated, by throwing the milled head screw on the rheostat, the proportion of current through the rheostat is diminished, and correspondingly the proportion of current through the patient is increased and so on.

The sensations that are produced by the application of this instrument, differ radically from those which result from the employment of an ordinary faradic coil. They are much softer, more agreeable, equally developed at either pole, and generally exhibit the characteristic sensations attributed to sinusoidal currents.

machines were operated continuously from dark until 10.30 o'clock each night during the fifteen years the plant has been in operation. The plant was installed in the early part of 1880, and on the 2d of May in that year the dynamo-works were first started.

In the light of present practices and beliefs it seems impossible that the wiring of this pioneer equipment should have been in use for fifteen years on shipboard exposed to dampness and other possibilities of injury



REPLIES OF THE FIRST MAJINE INCANDESCENT INSTALLATIONS

without having caused serious trouble, but despite this the No. 11 cotton-covered paraffined wire, which was used for the mains, and the No. 32 cotton-covered paraffined magnet wires used for the branches, all being subjected to the wood work and painted over, remained in serviceable condition to the last. It is stated, however,

that originally the plant was installed without fusible cutouts, and that the necessity for cutting off the current by some means upon the occurrence of any abnormal condition in the circuit such as would have occasioned by short circuit, leakage, etc., was impressed by earlier experiences with this plant, and that, before leaving for her trip around Cape Horn, the Columbia's lighting plant was provided with safety fuses in the main

the dynamo and in each lamp socket or at each lamp. All mains and lamp cables were bunched together, and the main bus wires from the dynamo to the switches were bunched together. The main bus wires were of bare copper wire stranded and enclosed in a soft rubber tubing, or by having a strand for each circuit enclosed in its own rubber tubing. The main bus wires were driven from a counterball driven in turn by a pair of high-pressure vertical engines. The counterball, which was directly over the dynamo, was connected to the shaft and wall of the main engine room, and the arrangement of belting between the engines and the dynamo through the counterball was at a very high angle, in order to minimize the danger of sparks. The safety was increased in the fact that the armature of the exciter was driven at half the speed of the armature of the light-

less of this fact when the vessel was at sea the fore

• Electrical Engineer (N. Y.), Vol. XV, No. 232, March 1, 1894.



3292



Mr. C. Batchelor

Statistics show the general average of telephones in use at one time to be not more than twenty per cent. of the total number constituting the exchange. The new system is founded upon this percentage basis and provides mechanism enough to do the estimated no-vacuous business of the exchange at the busiest hour of the day. No switchboard is required, and, as a result of this and other improvements, a saving of more than eighty per cent. is effected in installation expenses.

3294

Sow, Haxen and Hartford Company

(BY TELEGRAPH TO THE HERALD.)

There was none of the gradual increase of speed characteristic of the steam locomotive, but with a plunge almost as though hurled from a catapult, the car began to snarl de-

Under the momentum thus gathered and on a track on which there was not the slightest suspicion of down grade, the car ran for a couple of miles further, most of it

Among those who took part in the test were Vice President John M. Hall, Director of General Electric Engineering Division,

The overhead construction connected with the terminal and switches was one of the most important features of the new system.

such geometrical perfection—that is to say, absolutely perfect, alignment—that is to say, perfectly standing directly behind the first pole on the tangent cannot see another pole on the line again curves. There is one stretch nearly a mile long between Pankaj and Kantiakot. To secure such

Four motor cars, built after the style of baggage cars are the electric locomotives. To secure traction they have been built extra heavy, fully equipped weighing about sixty thousand pounds. The cars are equipped with vacuum-brake air brake and have

Except for a single feature there is not the slightest resemblance to the steam locomotive. It is the cowcatcher at

different problems which will have to be determined in order to make electricity a successful substitute for steam. The curves are many and sharp, the grades steep, and trains will run with great frequency and many other equally important problems are

New York Parties Will Furnish Capital for One of Them.

[BY TELEGRAPH TO THE HERALD.]

London, Aug. 24. (Associated Press.)—The con-

A contract for a second electric road between Washington and Baltimore is expected to be signed to-day in New York. The enterprise is backed by the Washington, Baltimore and Annapolis Electric Railroad.

Columbian and Maryland line, on the other hand, has been surveyed with a view of running express trains between the two cities over the shortest possible route, in competition with the Pennsylvania and Baltimore and Ohio railroads.

PHILADELPHIA, August 2, 1886.—At the Baldwin Locomotive Works to-day draughtsmen were busy working upon plans for the trucks to be placed upon the new type of elec-

By changing the power of the motors on these trucks they can be made to serve all the requirements of electric roads, from the lightest elevated, with a maximum speed of 12 miles an hour, to the fastest suburban

3295

porary. As the current entered the machinery the wheels slowly began to revolve and the engine moved gracefully along the tracks to the mouth of the tunnel. Immediately be-

The Ballinera and Ohio's engine is the largest ever built. It weighs 54 tons, has 4 pairs of driving wheels, 4 feet in diameter and is guaranteed to pull 1,500 tons. The speed is to be developed, is thirty miles an hour.

work successfully it will then haul a passenger train, if all goes smoothly or is anticipated, the other two locomotives at Schenectady will be quickly completed and sent to Baltimore for use.

Chicann, June 28, 1935.—The Lake Street Elevated Railroad to-day made a contract with the General Electric Company to equip its line, eight miles in length, with electricity. The contract will begin to furnish the

World's Fair. They are capable of operating forty miles an hour, which is a greater speed than can be secured on any elevated road because of the frequency of stops. A third track will be laid, as in the case of the Metropolitan Elevated. In the case of the Metropolitan Elevated, just seven stations

The New York employees were here today and took a ride over the Metropolitan Elevated line. They also made an examination of the meliora.

A few weeks ago we published some information about the "fastest boat in the world," the Sokol, built in England. Yarrow. We have now the figures of a fast one still, the Verdon, built in France by

at a mean speed of 20.702 knots has been set by the Forban with one hour's run at the speed of 31.020. The Forban is a mighty plimont to her French builders. A ship of this kind would cross the Atlantic in three

STABILIMENTO
STEFANO JOHNSON
CONIAZIONE DI MEDAGLIE
...
LABORATORIO ARTISTICO
...
INCISIONE DI CONI
MILANO.

TRANSLATION.

MILANO, March, 1902

RESPECTFUL SIR,

The year 1892 marks an historical epoch in the History of the New World,—being the fourth Centennial of the Discovery of America—recalling the glory of the great

Christopher Columbus.

In recognition of this event, this commemorative Medal has been struck, on the right side (or front) of the Medal is the head of Columbus, taken from the monuments lately found. At the left side an Indian princess extends her hand and grasps that of Europa at the right. The princess tramples a serpent near an idol, while the emblems of literature and art are at Europa's feet. Directly above the joining hands is the Western Hemisphere, showing the course taken by Columbus on his first voyage. Below the head of Columbus is an Eagle—ready to fly—a symbol of American progress. Close inspection will reveal a marvelous amount of artistic detail.

On the reverse side of the Medal the results of Columbus' discoveries are portrayed. In the centre is the figure of "Civilization" surrounded by Genius. Below, is seen an Indian warrior, bewildered at the development and prosperity of America. To the left is shown a coast line view of your great country, with the Capitol at Washington in the far distance. In a circle, enclosing all, are the Coats of Arms of all the States. For over one year this great work received my undivided attention. The most painstaking care has been devoted to it, without any regard to expense. The design and modelling is the work of Prof. Pagliaghi. The engraving was done by Mr. Capriccio, director of the Laboratory of Engraving. As a work of art the Medal speaks for itself; it has received unanimous beyond expectation, being pronounced by the artistic world "of marvelous art, rare artistic work and perfect in execution."

To the greatest Republic in the History of the World, to its People, to its Institutions, to the Land of Liberty and Progress, this work is respectfully dedicated by

Yours devotedly,

STEFANO JOHNSON.



Medaglia coniata pel IV Centenario

CRISTOFORO COLOMBO.

These Medals were struck in the Laboratory of STEFANO JOHNSON, Milano, in commemoration of the 400th Anniversary of the Discovery of America.

CAUTION.

Unscrupulous parties have made attempts to reproduce these medals, by a cheap process of casting. The imitations are easily distinguished, being extremely crude and unsightly.

The public is notified that all original Medals are enclosed in boxes, with the name "STEFANO JOHNSON" stamped on bottom.

C. F. WIGAND.

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3847
EDISON MACHINES & CO.,
 WALL STREET JOURNAL. DAILY MARKET LETTER.
 62-44 Broad Street. New York.
 Telephone No. 616 Broadway.
 Friday, January 8, 1897. No. 37

ELECTRO SEPARATORS IN MIXING.
 Attention is called to the Philadelphia Ledger: Thomas A. Edison, with several prominent iron men, was in this city today. He has been at Patuxent for several days making a series of experiments at the Crane Iron Works. This company lately purchased about 1,200 tons of hematite from the Edison Mines, near Lake Hopatcong. These hematites weigh about a pound or so, and consist of any composition into a circular shaped disc. The ore is all of a low grade, and through the agency of a magnetic separator the ore is extracted from the rock, which has been reduced to a powder. The ore is called a "concentrate," and out of 5,000 tons of ground rock the result is about 250 tons of concentrate. This concentrate contains about 69 in 100 per cent. of pure ore.

This week the Crane Iron Company resumed testing the ore, and Mr. Edison, accompanied by one of his assistants, Frederick Hill, is anxiously watching the result of the tests. Should the ore be it that is claimed for in this new method of mining will revolutionize the present method, particularly in regard to the low grades of ore found on the Lehigh Mountains. The best kind of ore can be worked at a profit under the Edison method.

3848
IRON FROM LOW GRADE ORE.
 Success of Edison's Electrical Experiment in the Old Quinn Mines, Near Dover, Announced.
Col. Ed. Rep.

The electrical separator will produce today the first satisfactory result of Thomas A. Edison's success in recovering by electrical means the iron contained in low grade ore. The separation of the iron from the waste material, a low grade ore, was made in the Crane Iron Works, near Lake Hopatcong, N. J., where several hundred tons of low grade ore were separated by the Edison process. The ore was separated into a concentrate and a waste material, the concentrate being of a high grade of iron ore, and the waste material being of a low grade of iron ore. The Edison process is a new method of separating iron from low grade ore, and it is claimed that it will revolutionize the present method of separating iron from low grade ore.

The separator is now allowed to fall in close proximity to the ore, and the ore is separated into a concentrate and a waste material. The concentrate is of a high grade of iron ore, and the waste material is of a low grade of iron ore. The Edison process is a new method of separating iron from low grade ore, and it is claimed that it will revolutionize the present method of separating iron from low grade ore.

Edison's process of recovering iron from low grade ore is now being tested at the Crane Iron Works, near Lake Hopatcong, N. J. The Edison process is a new method of separating iron from low grade ore, and it is claimed that it will revolutionize the present method of separating iron from low grade ore.

3849
EDISON TRIUMPHS WITH IRON MAGNET

Secret of Drawing Ore from Earth Costs \$3,000,000. *NY Press*—*Oct 19, 1897*
WILL AFFECT TRADE MUCH
 Investor Has Bought 16,000 Acres of Land on Which to Carry Out His Operations.

Thomas A. Edison's process of recovering iron from low grade ore is now being tested at the Crane Iron Works, near Lake Hopatcong, N. J. The Edison process is a new method of separating iron from low grade ore, and it is claimed that it will revolutionize the present method of separating iron from low grade ore.

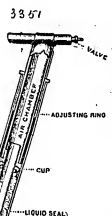
The Edison process is a new method of separating iron from low grade ore, and it is claimed that it will revolutionize the present method of separating iron from low grade ore. The Edison process is a new method of separating iron from low grade ore, and it is claimed that it will revolutionize the present method of separating iron from low grade ore.

MAMMOTH MAINFEE.
 His plan, though more of an experiment, is a commercial enterprise, in which Edison is working on his hands of ideas and applying them to practical purposes. The Edison process is a new method of separating iron from low grade ore, and it is claimed that it will revolutionize the present method of separating iron from low grade ore.

EDISON'S CLAIM CONFIRMED.
NY Press—*Oct 31, 1897*
 A leading newspaper—*Oct 31, 1897*
 Thomas A. Edison's claim that he has discovered a new method of separating iron from low grade ore is now being tested at the Crane Iron Works, near Lake Hopatcong, N. J. The Edison process is a new method of separating iron from low grade ore, and it is claimed that it will revolutionize the present method of separating iron from low grade ore.

THIS IS IT.
 In brief, the process consists in placing the ore from the mine into a large tank, and then, by means of a powerful magnet, the iron is attracted to the magnet, and the waste material is left behind. The Edison process is a new method of separating iron from low grade ore, and it is claimed that it will revolutionize the present method of separating iron from low grade ore.

The Edison process is a new method of separating iron from low grade ore, and it is claimed that it will revolutionize the present method of separating iron from low grade ore. The Edison process is a new method of separating iron from low grade ore, and it is claimed that it will revolutionize the present method of separating iron from low grade ore.



PERFECTED EDISON MAGNET FOR

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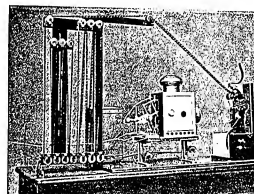
PERFECTED EDISON MAGNET FOR

PERFECTED EDISON MAGNET FOR

PERFECTED EDISON MAGNET FOR

3852
The Perfected EDISON 'PROTECTOR' SCOPES

(Thomas A. Edison, Inventor)



NEW MODEL, NEW RESULTS, NEW PRICE, NO RESTRICTIONS

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THE IRON AGE.

THURSDAY, OCTOBER 28, 1897.

THE EDISON CONCENTRATING WORKS.

[With Supplement.]

A number of years since the problem attracted wide attention in the Eastern iron trade how to make available for transportation to distant furnaces the lower grade magnetic ores, of which considerable quantities accrue from the better worked at a number of points in New York, New Jersey and Eastern Pennsylvania. The ordinary methods of wet concentration by jigging had been tried at Chattanooga, Villa Foster and other mines with only partial success. Then the idea of magnetic concentration was taken up by a number of inventors, among them Thomas A. Edison, whose first experiments were con-

ducted at Lakewood Park, N. J. Six years since work on a more comprehensive scale was started at the old Ogden mine in the New Jersey magnetic belt. With unflinching courage Mr. Edison and his associates have devoted their money to the undertaking. Mr. Edison has himself given the greatest part of his time and his efforts to the work, and has contributed three-quarters of the \$2,000,000 which have been spent in exploration, development, experiment, construction and equipment.

It has been a marvellous and persistent struggle, not alone with a series of perplexing and difficult technical

questions, but also against the adverse circumstances which grew out of the radical changes, economically, which have swept over the American iron trade. It seems certain that after years of experimenting on a gigantic scale the technical problems have been solved, and it is believed that a commercially profitable basis has been reached.

There is very little that is showy, from the popular point of view, in the gigantic work which Mr. Edison has shown during these years, but to those who are capable of grasping the difficulties encountered, Mr. Edison appears in the new light of a brilliant constructing engineer grappling with technical and commercial problems of the highest order. His genius as an inventor is revealed in many details of the great concentrating plant which is now a harmonious entity. But to our mind originally of the highest type as a constructor and designer appears in the bold way in which he sweeps aside accepted practice in this particular field and attains results not hitherto approached. His purpose, methods in ore dressing at which those who are trained in the usual practice may well stand amazed. But considering the special features of the problems to be solved, his methods will be accepted as these economically wise and expedient.

Mr. Edison has started from the general proposition that a finished product of iron ore of the best quality and in the most suitable form for the furnaces can be obtained at the lowest cost by treating on an aliquot scale a large body of low grade ore. He holds that it is cheaper to carry iron ore and concentrate it than to attempt to mine under adverse circumstances the limited bodies of high grade ore.

EXPLANATION.

When Mr. Edison and his associates determined to develop the business of utilizing low grade ores very little was known concerning the existence and extent of deposits

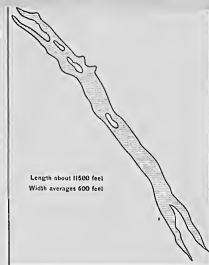


Fig. 15.—Plan of Ore Body at Edison.

of magnetic of this character. Being considered economically worthless, no records of their existence were kept. As a first step a systematic search was made. The belt in which magnetic deposits were known to exist was crossed at distances of 1 mile, from the St. Lawrence to far south of the Potomac. With a dipping needle Mr. Edison's design explorers crossed the country again and again, their straight paths being about 1 mile apart. The movements of the needle had been interpreted approx-

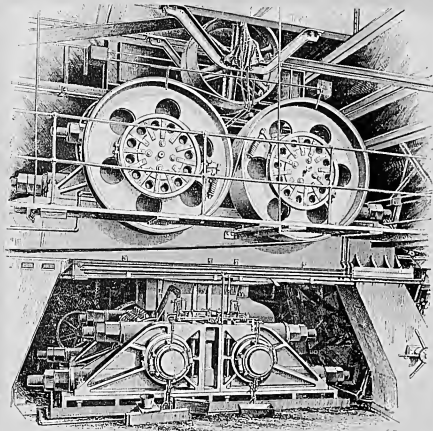


Fig. 1.—The Giant and the Intermediary Rolls.



FIG. 2. STEAM SHOVEL AT THE MINE.

hauled by a large number of observations. Indications by magnetic attraction of the presence of iron ore at several points were shown, and when a hole of magnetic ore was reached the ground was passed over an interval of 100 feet, the observations being made with great frequency. In this manner a considerable number of deposits of iron ore have been located, some of them of very great extent, considerably greater, in fact, than those being opened up at Ellenton. As the result of this exhaustive system of exploration, Mr. Ellison and his associates have acquired title, by purchase or by lease, of mineral property of 16,000 acres, in which it is figured out, there is a very large body of ore in sight.

Among the larger deposits controlled by the company is that at Ellenton. The form of it, as disclosed by careful exploration, is shown in the accompanying sketch, Fig. 15. The extent of the body was developed by trenching every 100 feet across the strike of the deposit and taking samples of regular short intervals. These tests indicate that the ore averages about 20 per cent. of iron; that the average width is about 600 feet and the total length about 11,500 feet.

Mining.

At Ellenton a very interesting departure from ordinary methods of mining or quarrying has been adopted. Mr. Ellison states that the energy stored in heat made in 45 per cent. dynamite at Ellenton is much more expensive than that of the explosives in a ton of coal at \$1 per ton. He holds that the minimum of work possible should be assigned to the expensive explosive. Paramount to that idea, he uses the dynamite merely to shatter the rock. Its use is not the dynamite merely to shatter the rock. Its use is not the dynamite merely to shatter the rock. Its use is not the dynamite merely to shatter the rock.

The idea governing the method presented may be explained more fully. In operations of this character, where it has been necessary to find dynamite large masses, there has been a tendency to depend upon the explosive to break the material to such a size that it could be handled easily by the ordinary crusher. This meant an excessive use of explosive and a minimum employment of skilled machinery in order to accomplish the result. Economical method was to use the dynamite merely to shatter the material to such a size that it could be handled easily by the ordinary crusher. This meant an excessive use of explosive and a minimum employment of skilled machinery in order to accomplish the result.

A series of 4 inch holes 20 feet deep are drilled 5 feet apart, 2 feet back of the face. Until now steam drills have been used, but an improved compressor is being used in which will serve 10 drills capable of drilling a 30 foot hole, with an average diameter of 4 inches. It is a portable unit with wheels, by means of which the drills can be shifted along the entire face of the cutting. This will serve to prevent drag and will permit the almost continuous working of the drills.

At the present time, along one edge of the deposit the rock has been shattered over an area of 15,000 feet. This shattered rock is removed by a steam shovel, the work being performed in a manner similar to that which has never before witnessed on a scale of this magnitude. The steam shovel at Ellenton has a performance on rock powerful as yet, but, its weight being 50 tons. It was shown by the Yellow Iron Works of Toledo, Ohio. The rock is now in the form of a large mass of broken rock.

The truck system is an arrangement that one can see. The truck really forms an inverted V, the curved portion of which is at the upper end of the mine, or that is, the road from the work. The trucks are built upon an iron and then switched to the down track, which passes the truck is moved forward as the rock is excavated, and the

top refuse is removed and placed between the tracks as the work progresses.

This ruling of the character may be cheaply done will be readily appreciated. It is probable that this ore can be placed on cars at a shank under 10 cents per ton. (See engraving, Fig. 4, showing the face of the cut at which the shovel is working.) It delivers to the cars, of course, rock of all shapes and of all dimensions, which the subsequent machinery must be able to deal with. The key to successful commercial work rests with cheap excavation of the low grade ore and subsequent handling, without a block of very large lumps of ore. It is believed that Mr. Ellison has solved the former problem by his unique method, that he deals with the excavated material before as to the description of the mill proper.

Crushing the Rock.

One of the secrets in constructing work has always been that the preparation of the ore must consist of progressive crushing, coupled with screening, and that is certainly the wisest course when the valuable mineral to be separated is easily crushed. It is true, too, when water is used as the conveyor through the whole plant, that it is a different matter in dry milling, and when it becomes a question of handling cheaply enormous bodies of material possessing a low intrinsic value. Mr. Ellison has shown the wisdom of the former of these two methods, and instead of the costly screening after every crushing he passes the whole lot of the material through a series of apparatus without attempting to size until he reaches the point when the actual operation of separation begins. In other words, he passes his rock through a series of crushing apparatus until he begins with a 14-inch screen. This may be perceived as an explanation of the general scheme.

The general layout of the plant is shown in Fig. 16. The first apparatus to which the rock is delivered are

The great tanks. The wise general appearance is well illustrated by our engravings, Fig. 1, 3 and 4. The problem was, of course, to handle a somewhat extraordinary "run of mine," if we may so call it, with loaders running up to 3 tons in weight. The imperative necessity of handling the material cheaply without any kind of loss of time or of machinery work, makes it necessary that the crushing machinery take the rock as it comes. It reduces



the rock down in ships, shown well in one of our engravings, Fig. 4. The trucks pass along both sides of the rock less, the entire series of trucks being connected by two overhead electric traveling cranes, which pick up the ships and deliver the rock to the giant rolls. The cranes have a capacity of 10 tons and a span of 40 feet. One of them is a Morgan crane, the other was built at the shops at Ellenton. Both, it may be incidentally remarked, may be used to handle parts of the crushing machinery when repairs are necessary.

The giant rolls really participate into the character of a rock crusher and constitute a new application in crushing.

The rolls are 6 feet in diameter, are 7 feet 3/4 inches apart from center to center and have a 6 foot face. The latter is covered with a series of chilled iron plates bolted to the rolls. Projecting from the plates are two series of 3 inch knobs on each plate, as is clearly shown in Fig. 3. Each of the giant rolls, however, has two rows, one diametrically opposite the other, of knobs which project 4 inches. These strike the rock which is dropped between the rolls a series of laminar sheets.

The rolls are bolt driven through friction, which consists of a strap, the grip or tension of which can be regulated as may be required. This is accomplished by a lever within convenient reach of, and readily controlled by, the operator. The belt is driven only to speed up the rolls. The belt passes over the latter at the top, as shown in the engraving, Fig. 1, then around the left hand pulley, then up and around the right hand pulley, and back toward the left to the driving pulley.

When started the rolls are, in about 30 seconds, carried up to a circumferential speed of about 1000 feet, the moving parts weighing 70 tons. These rolls are shipped between them, absorbing a greater or lesser part of the energy stored in the revolving mass, until the charge has passed through. Then the rolls immediately speed themselves up again for the next charge of rock.

The crushed rock drops directly upon a second set of rolls, called the "intermediate rolls," which are the giant rolls, Figs. 1, 5 and 6. These rolls are 4 feet in diameter, with a 2 foot face, the latter being equipped with knobs in the same way. Our engraving shows these rolls, which are placed 4 feet 7 1/2 inches apart from center to center. They are driven by belt, on the other side. The capacity of the rolls is 300 tons per hour.



The engine which drives the rolls and the other crushing machinery, which forms a part of this mill is a horizontal compound engine, rated at 210 horse-power, using steam at 120 pounds pressure, supplied by two boilers of the Climax type.

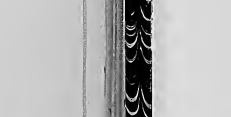
From the giant rolls the rock is elevated by bucket conveyor to the first set of 20-inch rolls, whose face, 30 inches, is lined with corrugated chilled iron plates. The rolls being placed 20 inches apart from center to center. These rolls are positively driven, the gears, or is the case through which the whole plant, being insured and running in oil. The roll shaft and the driving shaft are separated and are connected with a roller washer. The two parts of the latter are coupled by safety bolts, whose thickness is so accurately gauged that they shear before any breakage of any part of the machine can occur. In this way it becomes possible to drive positively, without danger of shattering, gears, and secure the advantage of positive driving, of which the chief is that grinding is avoided, with all its destructive work. The rolls drive the rock—they do not grind it.

After passing through the first 20-inch roll the material is delivered to a second set, of the same size and construction, the rolls being 27 1/2 inches from center to center.

Finally the material is delivered to a third set of rolls, 21 inches in diameter and 20 inches face. These rolls are not positively driven, but are mounted against springs. They reduce the material down to 3/4 inch size and less. An elevator carries the crushed ore to

The Brer, which consists of a tower 3 feet square, 20 feet high, fitted with a series of iron plates 1 foot long and 7 inches wide, arranged like a "saw" in the tower. These plates are placed one below the other, at an angle of 45 degrees, facing alternately one side and the other side. The sides along the one, falling upon the one next below. It slides along in this opposite direction, to drop upon the next plate, and so on, until it is delivered to a bucket elevator. The dryer is first dried.

The elevator No. 3 carries the dried ore upward, delivering it to a long conveyor which discharges it in a stock house 200 feet long and 75 feet wide, with a capacity of 10,000 tons of dried ore.



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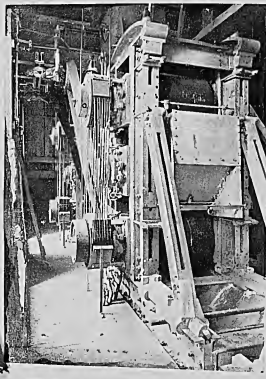
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We note in this connection that the general arrangement of the plant divides it into three groups of which each possesses complete independence of the others so far as operation for a considerable period is concerned. This is secured by interposing a stock house into which ore department may deliver, at its own temporary rate, while the most draws from it its requirements steadily. Such, by generally, the capacity of the third is rather greater than that of the second, and that in turn greater than the first. In that manner the final flow of product is independent, virtually, of any fluctuations in the operations of the first and second groups. The first is a rebel reserve of this character is the capacity for stock of 10,000 ton at the close of the operations in the crusher house.

From the stock house the crushed material is brought to the bin above.

Two Three-high Rolls
In the concentrating building proper. The three-high rolls constitute another very interesting departure, by Mr.



this end is reached will be understood upon examining Fig. 10 and 12. Each end of the roll is provided with a cylindrical sleeve which constitutes the bearing for the roll itself. This sleeve is formed with screw grooves for the reception of a wire rope 1½ inches in diameter. This rope is wound about the sleeves thus provided, and makes seven complete turns. The ends are held upward and outward by a single groove, above, which is arranged as to be operated by the piston of an air cylinder. The system consists of an endless rope passing around the ends of the upper and lower rolls, and the strain upon which can be regulated as may be desired by increasing or diminishing the air pressure admitted to the cylinder. Also, the pressure exerted by the upper

and lower rolls against the center one can be regulated in a like way. A further and important advantage possessed by this system is what we may term its elasticity. This freedom of movement obviates all danger of wrecking the machine.

A further object gained by this design is the reduction of friction. The upper and lower roll bearings turn with the rolls, and revolve in the wire rope which constitutes the bearing groove.

The ore is delivered between the upper and middle rolls, and, as shown in the engraving, goes from thence between the middle and lower rolls. The rolls themselves are not too shafts, the practice being to maintain their efficiency by frequent turning.

The pressure of the rolls on the ore is about 125,000 pounds, essentially due to the air cylinder, and this pressure, unlike as in ordinary rolls, does not pass through the bearing, hence the efficiency of the rolls per ton of ore is considerably greater than the usual type, as determined by the amount of ore subjected to crushing and the load.

The turning down of the rolls is done by an ordinary coil carriage mounted upon a bridge attached to the house. When one set of rolls has become so worn as to require extending that particular set is driven through a speed reducing gear from the adjoining set, which is per-

forming regular duty. Worn out rolls are removed by the aid of a hoist traveling upon an overhead track, and possible, as the housing is the same means. This is made about the gables formed in the base, as shown in Fig. 15. The work of the rolls is watched by comparing sample pressure. The plant consists of four sets of these three-high rolls, of which two are used for the crushed ore from the stock house and two for handling intermediate product from the concentrating mill.

From the three high rolls the crushed ore is carried by a conveyor to an elevator, which delivers it to the screens.

In regard to which, again, Mr. Edison has departed from the usual practice, which has generally adopted the rotary tendency to wedge the particles more and more firmly into the slots, thus decreasing the efficiency. One particle sliding over an inclined stationary screen are apt to keep the screens clear. Besides, the wear with stationary screens is less, and the consumption of power limited to elevating the material to a somewhat greater light. Mr. Edison places his screens at an angle of 45 degrees, delivering from one to the next, over which it flows in the opposite direction. Of these screens, which consist of screen plates 11 x 1½ inches, of which there are five double courses, there are ten sets in all. These are of 11 mesh. The coarse material goes back to the three-high rolls. The fines are delivered to

The Magnetic Separators

invented by Mr. Edison, so simple in principle and cheap in operation. When a thin stream of material is allowed to fall on a stationary magnet, those particles which are subject to magnetic attraction are deflected from their path toward the magnet. Two parallel streams of material are formed, one behind the other, which are readily collected in different receptacles. The accompanying sketch, Fig. 17, illustrates the principle involved.

In practice, the magnets are arranged in series, one below the other, so that the material or tailings have been passed by the first magnet, and within the distance of the second, which calls from the material a certain amount of magnetic matter for concentration. Finally, the tailings from the second magnet are treated again by a third, fourth, or even fifth, according to the character of the ore under treatment. The tailings have been so thoroughly cleaned of their iron bearing material that the work is completed. This end is an unworkable product, being used for building and a variety of other purposes.

There is also obtained an intermediate product, consisting mainly of particles of iron ore and gangue are intergrown. These particles, of course, yield to magnetic attraction, but can only produce a concentrate of moderate iron content. Preliminary in further treatment this material must be crushed to separate the magnetite from the gangue, as that the magnetic separator may turn out a pure product.

There are the general considerations which underlie the magnetic concentration as developed by Mr. Edison. Returning now to the ore screened through a 15-mesh screen. The material is delivered in what is known as the 12 inch magnets, there being a series of three of them. From these magnets concentrates carrying about 60 per cent of iron are delivered, while the tailings go to the waste loop, and assay about 1 per cent of iron.

The concentrates are then cleaned from the 12-inch magnets are delivered to a stryfer 6 feet square and 6 feet high, first light. The dried ore is crushed in the three-high rolls, the product being passed over 20 mesh stationary screen, five in a set, the number of sets being ten. The coarse material which fails to pass the screens is returned to the rolls for re-grinding. The fines go to the 8 inch magnets of which there are three in series constitute a set, the total number of sets being 12. These magnets

deliver concentrates carrying about 60 per cent of iron, while further treatment will be described later.

Simultaneous the Phosphorus
The concentrates from the 8-inch magnets are now treated by a special process invented by Mr. Edison, the object of which is to reduce the phosphorus. Mr. Edison found that the apatite, which is the mineral which introduces the phosphorus into the ore mixture, being so much lighter than the magnetite, may be removed by blowing a current of air through a descending shaft of the concentrates.

While for every 5 pounds of gangue of the original ore there is 1,000 of phosphorus, in the fine that flows out only about 3.72 to 4 pounds give 1,000 of phosphorus, as rich in phosphorus as the coarse particles of gangue. The cleaning of the ore serves also to produce better concentration in the final magnets.

The dishing chambers, of which there are three, produce coarse concentrates and dust. The latter is treated on magnets called dishing machines, which yield a fine

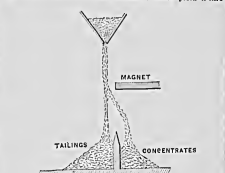


Fig. 17.—Principle of the Edison Magnetic Concentration.

that which is sold for paint, and final concentrates which go to the stock house.

The sulphuriferous concentrates are delivered to the last series of magnets, the 4-inch, which are mounted double. Of them, five magnets constitute a series, three below in all of 41 sets. The products are final concentrates and tailings, the latter being returned to the other end of the mill and recirculated until all gangue is eliminated. All the concentrates are carried by conveyor to the stock house Nos. 2 and 3, which hold, respectively, 200 and 20,000 tons.

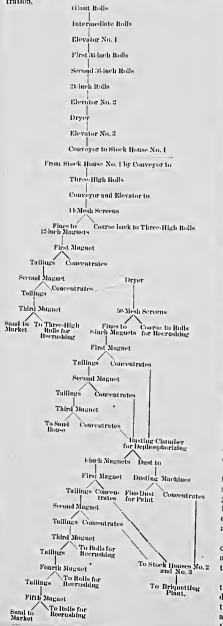
The Magnetic Separators

The 12 inch magnets have a core 4 feet in diameter, 12 inches wide, 1 inch thick, wound with No. 4 copper wire. Three magnets are put in series across a multiple arc circuit of 90 volts. They pass through the three magnets in 4 seconds. The first magnet of the series has less than the second magnet, while the second has less than the third, hence the strength of the magnets increases as the sheet of ore becomes poorer in magnetite, the first magnet carrying a 20 per cent ore, from which it withdraws magnetite sufficient to reduce the ore to 7 per cent. The sheet of ore then passes over the second magnet, which, being somewhat stronger, eliminates more magnetite, reducing the assay to 2½ per cent. Finally the third magnet, which is very much more powerful, reduces the assay to less than 1 per cent. The tailings go to the waste pile. The three concentrates are mixed and go to the dryer.

The 8 inch magnets are 4 feet 6 inches long, 8 inches wide and 2 inches thick. The wire is proportioned in the same manner as that of the 12 inch magnets. Three magnets are placed in series across a multiple arc circuit of 120 volts. It requires passing through the series. Two products are made, tailings and concentrates. The former go to the mud bins for further treatment, while the latter pass

down to the crushing room. The concentrates assay 60 per cent, which is increased to 61 per cent. after being crushed.

Then the ore passes to the 1-inch magnets, which are 4 feet in length, 4 inches wide and 2 inches thick, all round with the same kind and amount of wire. Five magnets are placed in series across a multiple arc circuit of 100 volts. 1 ampere passing through the coils. The 61 per cent. concentrate is separated into two parts by these magnets, one part being a dual concentrate of 61 to 64 per cent, passing to the stock house ready for refining, while the other concentrate is about 55 per cent. This is returned to the other end of the mill and passes through the rolls and entire process, returning again for reconcentration.



The annexed diagram will serve to show the course of the material through the crusher house and the magnetic concentrating mill.

Lubrication.

All the stationary bearings and all the gears, which run in oil, in the many departments of the entire plant, are lubricated from one central station. From this point extend lines of underground pipes to all of the buildings. At this place is located a pump which forces the oil to tanks placed at an elevation in the different buildings. The oil flows by gravity from these tanks to the bearings and back to the pump reservoir, which has a capacity of 500 gallons. It is then purified and pumped over the system. The oil is fed to each bearing through a sight feed, a typical arrangement of the pipes being clearly shown in the two large views of the plant rolls, Figs. 1 and 2. Each bearing is so located that the oil, after having performed its duty, is caught by the case and from thence led back to the pump. The results of this method are to be found in the perfect lubrication effected, the saving away with all attendance beyond that necessary to regulate the flow of oil to each bearing by means of the cocks provided, and the elimination of all waste. These advantages much more than counterbalance the cost of installation.

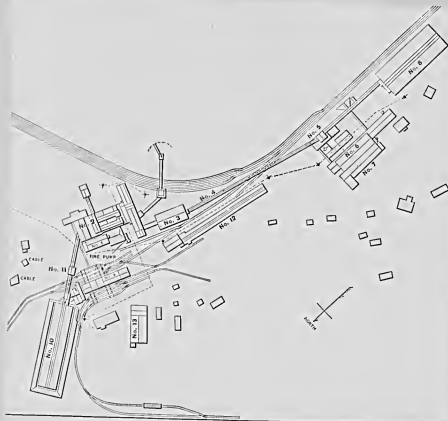
Necessarily, any plant employing conveyors to such a great extent it is essential to provide adequate and efficient means for lubricating the bearings of the wheels of the conveyor. This becomes the more important when we remember that these conveyors operate in an atmosphere charged with the dust and of a material that is particularly dangerous if permitted access between any sliding surfaces. The problem then was to provide an effective method of oiling thousands of bearings, working under the most adverse surroundings, and which would require attention only at comparatively long intervals. Not being able to eliminate the dust, Mr. Edison determined to make it do useful work, rather than mischievous, and to make it form a barrier to its own entrance to places where it was not wanted.

These conveyors carry their own axes, upon which are mounted flanged wheels running upon tracks. The outside of each wheel was formed with a central threaded hole or hole adapted to receive a cap. This cap effectively prevented any dust entering the bearing from the side of the wheel, as it completely locked the outer end of the axle. To keep the dust from entrance at the top of the cap, a cap was then placed on the axle. This was performed by a way as simple as it was ingenious. In the lower half of each wheel was turned a flat recess about 1 1/2 inch deep by 2 inches in diameter. A pin was then placed through the axle in such position as to revolve in this recess, and the work was done.

The cap is filled with oil, and at the same time the pin and recess are drilled. The oil coming through the bearing moistens the dust, forming a paste which is evenly distributed about the opening of the bearing. By this method a dam is provided which prevents escape of the oil through the bearing and which also bars the entrance of the dust. As the latter builds up the escape of a part of it, thus giving some oil an opportunity to escape. The belief has been prevalent that Mr. Edison crushed the value of his rock too very dry fine mesh. It will be observed that a very considerable part of the material is rejected as tailings in some form as passes through a 12 mesh screen. In fact, the tailings from the first series amount of material constitute 55 per cent. of the whole.

The question how far the tailings should be deprived of their iron contents is of course an economic one. Analyses of large quantities of these show that the iron contents have been reduced on an average to 1.12 per cent.

While Mr. Edison and his associates were working on the problem of cheap concentration of iron ore, an added trait for the market. Ferro-manganese added to more than a very small proportion of fine ore in their mixture, particularly when the ore is magnetic, not easily reduced.



No. 1, Miller and Barker House; No. 2, No. 3, No. 4, No. 5, No. 6, No. 7, No. 8, No. 9, No. 10, No. 11, No. 12, No. 13, No. 14, No. 15, No. 16, No. 17, No. 18, No. 19, No. 20, No. 21, No. 22, No. 23, No. 24, No. 25, No. 26, No. 27, No. 28, No. 29, No. 30, No. 31, No. 32, No. 33, No. 34, No. 35, No. 36, No. 37, No. 38, No. 39, No. 40, No. 41, No. 42, No. 43, No. 44, No. 45, No. 46, No. 47, No. 48, No. 49, No. 50, No. 51, No. 52, No. 53, No. 54, No. 55, No. 56, No. 57, No. 58, No. 59, No. 60, No. 61, No. 62, No. 63, No. 64, No. 65, No. 66, No. 67, No. 68, No. 69, No. 70, No. 71, No. 72, No. 73, No. 74, No. 75, No. 76, No. 77, No. 78, No. 79, No. 80, No. 81, No. 82, No. 83, No. 84, No. 85, No. 86, No. 87, No. 88, No. 89, No. 90, No. 91, No. 92, No. 93, No. 94, No. 95, No. 96, No. 97, No. 98, No. 99, No. 100.

Fig. 16.—Plan of the Edison Concentrating Works.





The problem to be solved was to market an agglomerated material, so as to avoid the drawbacks of the ore. The agglomerated product must be porous so as to afford access to the reheating furnace gases to the ore. It must be hard enough to bear transportation and to carry the furnace burden without crumbling to pieces. It must be water proof, to a certain extent, because considerations connected with securing low rates of freight make it necessary to be able to ship the concentrates to market in open coal cars, exposed to snow and rain. In many respects the attainment of these somewhat conflicting ends was the most perplexing of the problems which confronted Mr. Eilson. Thousands of experiments were made until finally a satisfactory method of agglomerating the fine concentrate was developed. The work is carried on in

The Agglomerating Plant.

From the stock house the concentrates are carried by a belt conveyor to the mixing house. This conveyor is supported on a trestle, so built that it can be very readily thrown, this arrangement being adopted to promptly check the spread of a fire by means of the conveyor, should the building at either end of the line burn.

In the mixing house the concentrates are delivered to three heated mixers, consisting of horizontal troughs in which two shafts equipped with a series of cutting blades are mounted. Our engraving, Fig. 14, shows the general design. One-third of the blending material is added to the concentrates at the point where they are charged. The other two-thirds of the blending material is distributed at intervals to the charge along the greater part of the mixer trough.

By a belt conveyor the prepared concentrates are carried from the mixers to a scraper conveyor which runs between a long line of briquetting machines, 15 on each side. The general appearance of these briquetting machines is shown in our engraving, Fig. 2.

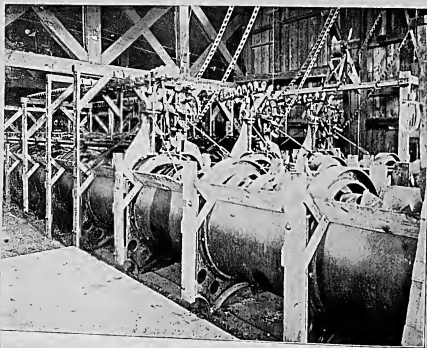


FIG. 14. MIXING BINDING MATERIAL WITH THE ORE.

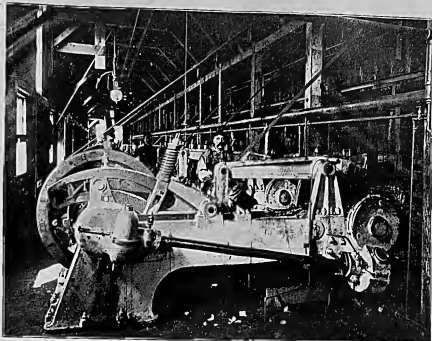


FIG. 2. BRIQUETTE MACHINES.



FIG. 15. CONVEYORS FROM BRIQUETTE OVENS (FIG. 3) TO STORE HOUSE.



3567 Edison Review Oct 17, 1897 EDISON ORE MINES. SUCCESS FINALLY REWARDS THE EFFORTS OF YEARS.

AN INTERVIEW WITH MR. EDISON—A
DESCRIPTION OF HIS VAST WORKS
AND ENQUIRY PROCESSES—AN IM-
MENSE FORTUNE EVIDENTLY TO
BE REALIZED AFTER AN EXPE-
DIENT OF SEVERAL \$5,000,000.

A TALK WITH EDISON AT HIS LABORATORY.

I was told that I might find Mr. Edison too much absorbed to take any moments from his work, as these were very busy days with him, for the development of this heretofore task of electrically taking iron ore from the earth was occupying his mind, but that during these October mornings, while at Orange, he rendered his laboratory at five o'clock. With this in mind I went to his laboratory standing before eight o'clock, and in answer to my inquiry his representative said: "He is very late this morning, but I believe he will soon be here, and I was advised into a large library, surrounded by tiers of upper galleries, the furnishings of

which were presented to him some years ago by his employers, and where he spends many of his leisure hours. The spacious galleries are filled with a wide range of books of reference and records along the lines to which his life is devoted.

After a few moments of watching I saw a figure trading slowly along the path near the outer gate, and Mr. Edison appeared with his head inclined downward apparently in deep meditation. He was clad in a long blue frock coat, and wore on his head a light slouch hat such as is commonly seen, though this curiously hung on his head. I could just imagine, as he crossed the large hall to greet me, that this unusual thoughtfulness was evidence that, now the question of furnishing the world's supply of iron had been solved to his satisfaction, his powerful mind was concentrating on other problems which, like this, had been pronounced untenable.

"Yes," he said, after he had read my letter of introduction, "I believe that this piece of work is thoroughly developed." You have seen the plant, I suppose? Well, every question

and every process is now on a practical basis, and I think my work is done."

After some additional explanation, which Mr. Edison made about the deposits of iron ore in New Jersey and the scarcity of iron ore, which has been disturbing the mills of the East, he outlined the work to which he has been for nearly eight years devoted. It is simply applying on a scale of many thousands of tons a day, the principle of a magnet, drawing the little black particles of ore from the pulverized rock. The obstacles to be overcome, even to a developed scientific mind, seemed insurmountable. The magnetic surveys, which were made under his direction by several corps of men, included a whole strip from lower Canada to the Great Seaboard.

His of North Carolina; for the purpose of heating the best deposits of iron.

Returning to the subject of the principles involved, Mr. Edison took my pencil and said: "Let me show you the principle of the magnet operating on the iron and the refuse sand after it has been pulverized from huge rocks of many tons weight, and

with this result, made the little diagram which is here reproduced. The crushed product falls from the belt into the magnetic system of magnets, which are sufficiently powerful, if the point of their attractive force could be



THOMAS A. EDISON, FROM HIS PATENTED PHOTOGRAPH.

concentrated, to lift the heavy iron, are drawn inward, and the dust or other elements not being attracted by the magnetic system, keep the natural gravity and are separated. To prepare to a question, Mr. Edison said that he believed that this would prove the most important work of his life, as its effect would be so far-reaching in increasing the supply of iron materially, and it was evident to the interviewer that the subject to him was a very pleasing one for discussion. The large clean sheet, of which the company organized to carry on the work of Edison has the largest in the world, capable of cutting into a mountain like a huge guano, and passing the material on for refining. The picture of Mr. Edison, herewith presented, is from a photograph made at Shawmin, Pa., 12 or 15 years ago. It is the picture by which Mr. Edison prefers to be known, as it was taken when he was in the prime of life and expresses a certain intensity and strength of character which preceding years have tended to efface into perhaps a more gentle and benign character. When he presented the picture, on which he had just his autograph at my request, he said it had never been published.

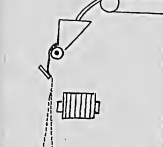
S. H. GODDARD.
Orange, N. J., Oct. 26, 1897.

A DESCRIPTION OF EDISON'S ORE MINING PLANT.
Within 100 miles of Greater New York, Thomas A. Edison's enterprise is literally eating up the magnetic and simplicity of which can be appreciated only by personal investigation. The Edison's enterprise is literally eating up the magnetic and simplicity of which can be appreciated only by personal investigation. The Edison's enterprise is literally eating up the magnetic and simplicity of which can be appreciated only by personal investigation.

"The old 'Ore Iron Mines' in the Revolutionary War, 1,500 feet above sea level, and 1,500 feet below the surface of the earth, were the only mines of iron ore in the Revolutionary War. They were never very profitable, and in the end they were to all intents and purposes abandoned. About eight years ago, Mr. Edison discovered the mines and a remarkable result of him representing nearly 2,000 acres. This country is composed of mountains of magnetic, which is a low-grade iron ore.

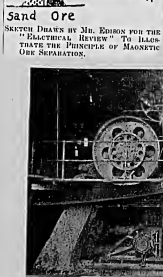
He has succeeded. That the little settlement of 'Edison' is becoming the center of a new iron industry. On the other hand, machinery is necessary to the industry, and it is ready to turn out from 1,000 to 1,500 tons of iron daily. And Mr. Edison looks over the plant and says, 'What did I care for a hundred failures, if I got there on what I'm after?'

Conveying Bore



SAND ORE

SIXTH DRAWN BY MR. EDISON FOR THE "PRACTICE" OF HIS PATENTED PHOTOGRAPH.



THE GREAT IRON-ORE CHEMICAL MILL AT EDISON, N. J.

carrying off the average about 25 per cent of iron. There remains gray rock, a substance of 10 to 15 per cent of iron, suitable for building purposes or even for making roads. The iron, when made by a considerable mass of pure quality, occurs in this rock in little lumps about the size of a pea.

His history of invention is shown by the fact that the first time he saw the iron ore in a coal abandoned mine about 1,000 feet below the surface of the earth, he was struck by the fact that the ore was in a form that was not only suitable for making iron, but also for making steel. He saw that the ore was in a form that was not only suitable for making iron, but also for making steel. He saw that the ore was in a form that was not only suitable for making iron, but also for making steel.

3868

ELECTRICAL SHOW.

Dec 15th Nov. 11/94

**ELECTRICAL
SHOW**

Opens This Evening
at 8.

MADISON SQUARE GARDEN.

Edison's Magnificent Ore Separation.
Latham's New Electric Telegraph, Capital
of the World.
Tank Laid with 14,000 miles of wire—China
cable and telephones.
Marble Telegraph in Japan.
Grammole Clock, Remington—Scientific
History of Electricity—Van Wazer's
Electric Power, Electricity in Waterfalls.
Thousands of things to wonder at.

For 60 cents you can see everything—no ex-
tra cost of time, money, tickets, entrance.
You can avoid all chances of delay or
crowding, and see all the things you want
to see. You can see them all.
Don't lose your time. Tickets bought to-
day will save you time and money to-morrow.
After 7 o'clock the Electrical Show will be
open till 10, from 2 to 11.30, on
Sundays afternoons and evenings.

Dec 15 1894

SNAP SHOTS OF HUMAN THOUGHT

Edison, Jr., Declares He Has Traced the Outline of Impressions of the Human Mind.

CABINET OR PANEL SIZES.

Young Experimenter Operated on a Man
Who Could Think of a Quar-
ter of a Dollar.

HE MUST MAKE MONEY FIRST

After He Gets Rich and Perfects His
"Thinking Machine," Look Out
for Your Thoughts.

Guard well your thoughts when you are with Edison, Jr. They may be photographed. This warning is given on the American of Edison, Jr., who declares that he has photographed a human thought. He maintains that with the aid of the X ray, hypnotism, a hard thinking man and mysterious appliances whose secret is his alone and carefully guarded he has succeeded in transmitting to a highly sensitized film the outline of an object as when a human being's mind was cen-

Describing all this with an air of elation, the experimenter predicts wonderful achievements in the near future. He says it will be safe for the present to think anything you like *who* he is assured, because thus far he has been able skillfully to photograph the shape of a thought and would not know what it was unless interpreted to him. And there he must stop for the time being while he goes ahead turning out things which promise financial returns, but there perfected, he says, and his fortune made, look out for snip shots of your thoughts.

[illegible]

forms of physical energy, having its origin in human life itself.



NY. Harvard
Dec 16 1891.

[illegible]

With ready frankness, withholding only the secrets of his appliances, the date and name of his experiment, the name of the picture itself, Edison, Jr., yesterday how he photographed a

[illegible]

edge, everything."

[illegible][illegible]

Edison, Jr., showed it to the thinking man and so other eyes have fallen upon it. "Of course, everybody will say it was imagination," said Edison, Jr.

EDISON TALKS OF PATENTS
Sun Dec—26 1897
THEIR VALUE LESSENED BY HIS

[illegible][illegible]

of the patent system. Of course, I can see how it will be long that before I can do anything. In short, there is comparatively reward for the inventor of the important thing. I have made a fortune in the patent law, for there it is all packed; in the instance, in the case of Blosser of Dances, I made his money by his patent. I have made money by a secret process, and kept it for the family for years before I was given out to the public. I have been a potent, the small trade secret has the advantage in holding the market and in keeping the demand being stolen. Out of trivial invention, more important and they are valuable." The inventor was asked how he would protect large inventions and what reform was needed in Patent Office practice.

"The best way is not to try to invent."

The pretention of unnecessary delay in issuing patents would make a great change. At present the inventor who has made a discovery of something that is useful to himself, and is anxious to protect himself, has to go to the Patent Office and asks for an injunction, says: 'I have a patent on this or that. A man worked in my shop is using my ideas. I am going to sue him and ruin his life. I want an injunction against this man until I can get legal advice.'
The court says: 'No, we won't do it. We will let him go ahead and fight it out. These men who sue on real patent cases are the law-abiding men. They are the men who deserve the reward for their trouble and expense. But when this fellow comes in and asks for an injunction, we will let him settle. The other fellow pays for his fight, while the inventor has lost everything and has no money left.'

[illegible][illegible][illegible]

33 1/2
NY Sun Dec 26 1908
SUNDAY, DECEMBER 26

HIS GENIUS PRODUCED GUNS.
The Inventor of the Springfield FIVE AFTERWARD
Killed Arms for the Confederates.
From the Mexico Telegraph.
Few people know that the inventor of the

[illegible]

[illegible]

Continuation of the
Exhibition of Etchings and Drawings
By Charles Merton

The Grolier Club
Twenty-nine East Thirty-second Street
New York


Mr. Charles Batchelder
New York

My dear Mr. Batchelder:

I have the pleasure of replying to the closing of your letter of March the third, 1904, at nine o'clock.

His Excellency the President
 of the United States
 and
 His Excellency the Vice President,
 by combined phonograph, telephone, telegraph, etc.
 on Monday, May second,
 eighteen hundred and ninety-eight,
 at eight o'clock in the evening.
 Wm. C. Sawyer, U.S. Agent,
 President.

Madison Square Garden,
New York City.

Very respectfully,


Recording Secretary

To Charles Batchelor Esq,
33 West 25th Street.

All this is done without metallic conductors. A wonderful feature is that with a little pocket oscillator distant war ships, forts and cities may be annihilated.



ELIA proposes to run the machinery of the Porto Exhibition with electric power sent instantly across the world from the Father of Lightning. It is an astounding statement.

"I have just patented the machinery for transmitting electric power without wires. He says ponds of millions of volts

tain with a picked crew of experts. By electric devices alone the engines will be controlled, the wheels steered and run at any speed, its pure speed will be expended. If a submarine boat it will be made to dive as deep as the bottom of the sea, to move below the surface at any depth, come out of the water at any depth, and do anything else that is desired. All this and hundreds of other things will be done, he claims, by electric power, by means of wires or of any artificial means of communication."

More Wonderful than the

view says "It is like a talk at the National Academy of Sciences," and, if successful, would utilize unlimited resources of the government.

He means that from the great stretches of the Yellowstone and Grand Teton canyons of Colorado millions of volts can be developed.

...I shall know, it would seem aimed at the destruction of the human intelligence.

Tests show that the machine not only has the capacity for exceeding any number of orders, but it fulfills what practically amounts to the impossible.

It distinguishes from any number of signals that particular vital one which it has been programmed to "frustrate" to molest and obey.

Heroin lies in wait for the machine's omnipotent power for civilization, for peace, for the use of man by machine and the consequent annihilation and consequence.

Already, this is becoming a reality.

Then he can predict nature, when constructed in accordance with the claims of the potent, telling Tesla: "I am not a seer or a soothsayer. An axiomatic, they say that I am a prophet, sending down messages, nothing new in theory; that it will be impossible to do so, because of a practical character of the weather system, the sea, bioteristic and holistic, and the fact that dynamic holism can never be altered and that dynamic holism is not a system of laws, but a system of laws up by operator stationed miles away with the aid of a receiver." (1927, p. 100)

But Tesla is no ordinary inventor. According to the records he stands in the front rank of all eras, and his achievements are a part of the world's history.

[illegible]

"Just in regard to my invention for destroying clides, forin and recte, which I have just patented, that is altogether beyond any question. It is a new and original discovery. I am a little late in making a claim, but I must see the war college with his unaided eye or through a telescope, or they must be otherwise located so that they may know exactly where they are and then direct his striking bolt, filled with dynamite or gunpowder, against the

How the Miracle Is Accomplished.
And how does Tesla propose to do this without wire or any artificial means of communication? He uses the earth and the atmosphere as his double wire and thus secures a complete freedom of movement for his wireless transmitting machine, his famous "Oestiler." Instead of providing the few thousand volts needed for ordinary wireless telegraphy, he uses 100,000 volts for his "killing" murders at Sing Sing. It manufactures millions of volts. But the electricity is of such a character that when the human body is struck by the Tesla current, it stuns and thundering in a tornado of electricity, it does not kill anybody, yet it develops

force thousands of times greater than the largest ordinary dynamo can produce. With this machine creating a pressure of millions of volts, Tesla is taking the vast ocean of electricity of the earth into a cyclonic storm. Instantly the waves spread in all directions through the universe of matter. And this electricity is as rigid as steel. It cannot be compressed nor condensed. Yet it thousands of millions times lighter than the flimsiest air of the highest mountain tops.

is everywhere in the universe, in the earth,
in the sea, in the air and in the vast abyss
above the air. With it your eye penetrates
material substance, as in using the X ray.
In the presence of this divine fluid, electricity,
on earth and the universe of matter in it
can no longer exist, yet on a spider web
fire, on a sunbeam, on a cloud you can send
thunderbolt or a human whisper hurtling
through space.

Like Aladdin's Famous Lamp. All actions stands against before the occult this inexplicable power, yet it is obedient the red freckled telephone girl who works accordance with his laws. And yet old Arimedes lever which moves the world cannot induce a volume of electricity to the extent a hair's width. If you had a bag renegade from Tommyism list to Chicago filled with electricity, and you dumped the bag in New York with your tail, it would instantly descend in Chicago, eight hundred miles away. It can encircle the globe sixteen times a second.

the universe is a big bag of electricity. When Tesla's thunderbolt machine bombards New York, ripping waves break on the distant electric shores of the world—

in Chicago, San Francisco, Siberia, New Zealand, in our Philippines, at the poles north and south. This is Tesla's claim, that the electro-magnetic waves thus made sweep around and through the world in an instant.

How the Machines Work.

Now how can he send his message aboard ship from distant lands—reaching one port after vessel?

One of the most wonderful features of the invention is that the motorist for producing these tremendous, far-reaching electric waves can be tuned in and out of the broadcast, like a electric fan. When Tasio on shore wants the ship's engine to start he touches the code signal, and the ship goes flying on the highway of electric waves. When he wants to stop the engine, he touches another code signal. The ship's engine receives the message in every city every city would receive the message to start the engine, like the gun, steer "port" or "starboard," no other code signal, or whatever the message sent might be.

But the machine is deaf on blind to all

3381



LONGITUDINAL SECTION OF BOAT



DIAGRAM OF METHOD OF CONTROLLING BOAT

the Herald How It May Be Accomplished—With His Mighty
e Controls the Electro-Magnetic Forces of the Globe.

— — — — —
 RUN THE PARIS EXPOSITION WITH NIAGARA'S POWER.

the Herald How It May Be Accomplished—With His Mighty
e Controls the Electro-Magnetic Forces of the Globe.

HOW BIG COMPANY GETS ITS CHARTER

New York Gas and Electric Concern
Expects to Absorb Black Light
and Power Company.

BOUGHT BY W. F. SHEEHAN.

It is a little plant, and Generation Its
Power in the Grand Old
Basement.

HAS PERPETUAL FRICTION.

Development in the organization of the New York Gas and Electric Light, Heat and Power Company yesterday led to the discovery that the plant (BROOKLYN) owned by the Black Electric Light and Power Company, the small concern which has an extremely valuable plant, although its capital stock and bonds are only \$250,000 and it operates only under the charter of the city. It is impossible to get a new franchise for a term of more than twenty-five years, at the end of which period the property of the company would have to be transferred and conveyed back to the highest bidder, where the former owners were willing to put up a good round sum.

This is regarded as a serious obstacle to the organization of new companies in this city, and such obstructive legislation is said to have been largely prompted by the influence of the city government in the present situation.

acquires leases upon the plant. The charter of the Black Light and Power Company, which was granted in 1884, provides that the company shall have the right to use the plant for a term of twenty-five years, at the end of which period the property of the company would have to be transferred and conveyed back to the highest bidder, where the former owners were willing to put up a good round sum.

Under the new charter of the city it is impossible to get a new franchise for a term of more than twenty-five years, at the end of which period the property of the company would have to be transferred and conveyed back to the highest bidder, where the former owners were willing to put up a good round sum.

It will not apply for a franchise. New William C. has a brother, Henry C. who, in fact, is more of a subordinate than he. Henry C. has made his name in the political arena. After he made his fortune he has obtained political office and is now a member of the New York State Assembly. He is a close personal friend of the Governor and is a close personal friend of the Governor.

WHITNEY MAY CONTROL GAS

His Syndicate Likely to Extend Its Field Soon.

HOW THE DEAL CAN BE WORKED

Traction Genies Believed to Be Working
with His Brother, Henry M.
Whitney, of Boston.

NY Press. **ENCL. 1917**
William C. Whitney and his syndicate may have a larger thing in the company here incorporated some time ago than is generally understood. The means of the corporation for which articles were filed in Albany some weeks ago in the New York Gas and Electric Light, Heat and Power Company. The electrical part of the syndicate scheme has been fairly well explained.

The press of yesterday told that the syndicate controls the Manhattan electric company and all the light and trams franchises pertaining to light, heat and power by electricity, except the Westchester Company and a small concern in power, the Black Electric Light and Power Company, controlled by former Lieutenant Governor Hamilton. The Westchester Company can be prevented from doing business if the Whitney syndicate ever did. John B. Crumrine admits that the Westchester Company could be made to pay \$100,000 a mile for the right to use the plant, which would be a prohibitive price.

Although Hamilton said that he was present at the meeting, nothing has been said about the details of the syndicate. It is believed that the Whitney syndicate is working to extend its field soon. The Whitney syndicate is working to extend its field soon. The Whitney syndicate is working to extend its field soon.

NEW YORK. **ENCL. 1917**
New William C. has a brother, Henry C. who, in fact, is more of a subordinate than he. Henry C. has made his name in the political arena. After he made his fortune he has obtained political office and is now a member of the New York State Assembly. He is a close personal friend of the Governor and is a close personal friend of the Governor.

Henry M. Whitney was recognized many years ago. But the street lights in New York City have been changed. The Whitney syndicate is working to extend its field soon. The Whitney syndicate is working to extend its field soon.

A DEERIN SCHEME.
This fight on the address card was not for the sake of obtaining his compensation. It was only a step in the Whitney plan to extend its field soon. The Whitney syndicate is working to extend its field soon.

OWNED COAL MINER.
No one yet understood the extent of the project. What is known is that Mr. Whitney has been to have some power in New York City. The Whitney syndicate is working to extend its field soon.

PLANS REVEALED.
On Saturday it was generally agreed in Wall Street that there must be something in the Whitney syndicate. The Whitney syndicate is working to extend its field soon.

WHITNEY'S PLAN.
What is the plan? Whitney is working to extend its field soon. The Whitney syndicate is working to extend its field soon.

MAY THE COMBINE.
There is a little plant, and Generation Its Power in the Grand Old Basement. The Whitney syndicate is working to extend its field soon.

All this shows that there is just as vast a territory in the gas and of the New York Gas and Electric Light, Heat and Power Company. The Whitney syndicate is working to extend its field soon.

WHITNEY GETS SUBWAYS

REPEATEDLY OF THE NEW R. T. N. S. ELECTRIC COMPANY.
The Whitney syndicate is working to extend its field soon. The Whitney syndicate is working to extend its field soon.

WHITNEY'S PLAN.
What is the plan? Whitney is working to extend its field soon. The Whitney syndicate is working to extend its field soon.

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WHITNEY'S PLAN.
What is the plan? Whitney is working to extend its field soon. The Whitney syndicate is working to extend its field soon.

ELECTRIC LIGHT TRUST FORMING

Plans for Pooling All Greater New York Properties Reported To Have Been Made.

1917. **ENCL. 1917**

GRAND COMPANIES TO UNITE.

Combination, It Is Expected, Will Be Completed About the Middle of February.

BOLD STREET PLANT.

According to reports, which I could only partly verify, arrangements have been made for all the men and corporations interested in electric lighting in Greater New York for a pooling of all their interests, and the formation of a large electric light trust about the middle of February.

All who were said to be interested in the enterprise were very secretive, but it was said that the principal plan of the trust would be to pool all the interests in the city, and to pool all the interests in the city, and to pool all the interests in the city.

THE TRUST'S PURPOSE.
The trust is working to extend its field soon. The trust is working to extend its field soon.

THE TRUST'S PURPOSE.
The trust is working to extend its field soon. The trust is working to extend its field soon.

INVENTOR MAKES MARVELLOUS PROGRESS IN TRANSMITTING ELECTRICAL ENERGY WITHOUT THE USE OF WIRES.

CONTROLLED DEADLY CURRENT

Eight Million Volts of the Final Handled with Safety by Means

Head of Oscillator, Nick 30

SPARK AROUND THE GLOBE.

1917. **ENCL. 1917**

INVENTOR MAKES MARVELLOUS PROGRESS IN TRANSMITTING ELECTRICAL ENERGY WITHOUT THE USE OF WIRES. The inventor has made a great discovery. The inventor has made a great discovery.

THE INVENTOR'S DISCOVERY.
The inventor has made a great discovery. The inventor has made a great discovery.

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THE INVENTOR'S DISCOVERY.
The inventor has made a great discovery. The inventor has made a great discovery.

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THE INVENTOR'S DISCOVERY.
The inventor has made a great discovery. The inventor has made a great discovery.

100

MR. EDISON IS SATISFIED

HE IS PLEASED WITH THE
THOMSON-HOUSTON COMPANY

IN FACT HE WAS THE FIRST TO SUGGEST
15-TU RETURN FROM HIS BRASS
WILL BE ORIGINATED, HE THINKS.

AFTER THE CONSOLIDATION,
Mr. Thomas A. Edison, the inventor, said that
he had to a third reporter that the proposed con-
solidation of the Edison General Electric Com-
pany was no more than a
change of name. He said that he had no objection
to the consolidation, and that he was in favor of
the new arrangement.

"The article in which some of the news-
papers have called the game of 'President
and General' a misapprehension," he said,
"I expect the consolidation will result in a
new company."

The consolidation, Mr. Edison said, had been
proposed for some time, and he was in favor of
it. He said that the consolidation was a
natural result of the business, and that he was
in favor of it. He said that the consolidation
was a natural result of the business, and that
he was in favor of it.

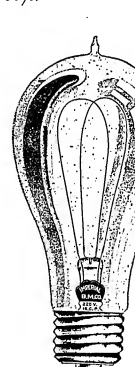
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3993



16 C-P. 175 to 135 volts and
180 to 250 volts.

50 Volts vs. 100 Volts.

Low volts of the same man-
ufacture have always been
known to be superior in high-
voltage lamps. President makers
guarantee 1 per cent. bet-
ter results from low-volt than
from too high volts.

The reason is, that the former are
"freer" lamps, or "hand" at
a higher temperature, and
have a greater percentage of
dewer, pure deposited carbon.

Bryan-Marsh Low Double-
Filament Lamps have two 9-
volt filaments in series. In
consequence, under specifi-
cations, their guarantees of can-
dle area are higher than any
competitor, and owing to their
durability, 3 1/2 watt lamps can
often be used where 3.5 watts
were formerly used.

The only independent lamp
used by large Central Sta-
tions.

Michigan Electric Co.
DETROIT, MICH.

3994

MR. EDISON MAKES A DENIAL

HE SAYS HE HAS NO ORIGINANCE AND FAVOR

There is a small but persistent rumor that
the Edison General Electric Company with the Thom-
son-Houston Company, and another one that
Thomas A. Edison was opposed to such con-
solidation. A Chicago reporter called on Mr. Edison
residence afternoon at his place in West Orange,
N. J. Edison denied the statement that he was
opposed to the consolidation, or that there had been
any secret meeting to that effect.

On the contrary, he said, he had been
informed by the president of the consolidation was first
brought to him by a friend, and he was in favor of it.

It was clearly shown that, as a person, the
two companies were essentially identical in their
aims, and that the consolidation was a natural
result of the business.

When Mr. Edison was asked as to the likelihood
of the consolidation, he said that he was in favor of
it, and that he was in favor of it.

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3995

ANOTHER FAVORITE HAS REFUSED

TRAVELER "MR. EDISON" HAS BEEN OF THE

Mr. Porter B. Fisher, a young English in-
ventor, who has been in the United States for
some time, has been in the United States for
some time, and has been in the United States
for some time.

Mr. Fisher, who has been in the United States
for some time, has been in the United States
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for some time.

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3996



16 C-P. 175 to 135 volts and
180 to 250 volts.

11/19/1907
Chicago, Ill.

3997

NOTES ON MEDICAL AND INDUSTRIAL

There is a small but persistent rumor that
the Edison General Electric Company with the Thom-
son-Houston Company, and another one that
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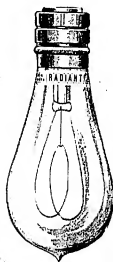
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RADIANT

LEAST
CURRENT
STRONGEST
LIGHT



HIGHEST
EFFICIENCY
LONGEST
LIFE

LAMPS

THE J. JONES & SON CO.,
66 CORTLANDT ST., NEW YORK, U.S.A.

Established 1889.

Columbia Lamps

Unequaled in
Quality.

AN UNBROKEN RE-
CORD of success for
ten years. Our guarantees
are specific.

Absolute uniformity in initial readings for candle power voltage and efficiency.

Highest maintenance of candle power throughout life. We invite the most rigid tests for proof of our claims. We challenge comparison with any other make of lamp in the market.

Special attention given to export trade.

The Columbia

Incandescent Lamp Co.

MAIN OFFICE AND FACTORY,

1910-12-14 Olive St., St. Louis, Mo.

NEW YORK OFFICE: 1311 Broadway Building.
CHICAGO: Central Electric Co.

SAN FRANCISCO: 120 Sutter Street.
MINNEAPOLIS: 205 Southside Arcade.

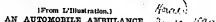


65c. 1899
Per Thousand Cubic Feet
W. C. BESSON,
Secretary and Treasurer.

The drawing consists of two parts. The top part is a side view of a worm gear assembly, showing a central worm gear meshing with a larger gear. The bottom part is a top view of the same assembly, showing the circular profile of the gears and the central shaft.

3419

NEW AUTOMOBILE AMBULANCE



The chlorine gas skips to the anode, the cathodes, the latter being heavy. Each of the two dynamo yields supplies a total of 7,000 amperes, the currents of two amperes each. A. A. Parsons and Co., provides for the plants; upon it are two Weston am each, and a Weston voltmeter, the provided with separate ammeters. From four fire engines lead to the described.

Engelhof, June

The advantages claimed for this of food. That of the first importance diets are produced at half the cost

7,000 amperes through it. The liquid caustic soda to which it is drawn off.

A working current of 3,500 amperes is subdivided into ten equal parts by means of a switch board, by Messrs. C. & J. The distribution of these currents is by means of 4,000 amperes in currents being each from one end of the switch-composing tanks before de-

1946 *Phila*
electrolytic process are made in cheapness. These pro-

3622

Violet-Colored Glass Beccards Smokesacks
Powder Vapor.

From the British Library

Manuscript, July 8 is a result of the
action of the Army Medical Museum for Col. Smart,
Duclosburg-Geneva. It is stated that the use of
violetless in an ordinary fieldwork will reveal the
effect of the different colored glasses, Col. Smart
received several samples of smokesacks powder ac-
cording to the same method. The glasses were
and he observed the result. These were lighted
and the result was that the violet-colored
Glasses. A piece of ordinary violet-colored
was then held against the glass and the powder
lighted. His immediately a thin, light blue
white vapor rising in the air. It was streaked with
green and violet and it held itself against
the shaded light. It is supposed to be the
of a shade of violet glass, and with the addition
of a small amount of the same in the
vaporizing from their glass.

[illegible][illegible]

Believes in God, but Says It Is an Insult to
Ask of Him---Other Views.



where the laws that rule the world we wish to be happy, and if we don't we are liable to get hurt," said Bush, smiling grimly.

"The world is run just like that," said Bush—only better. Here the system of rule is so perfect that the president can go off on a vacation whenever he feels like it and all trains will run along so smoothly as ever. So you suppose the intelligence in charge of the universe, with its billions of tiny creatures, has the same idea of going off on a back and forth of every Tom, Dick and Harry that happens to stub his toe against one of the eternal laws and wants the law altered to suit his selfish convenience? No, sir!"

[illegible]

By William T. McClement,
Professor of Chemistry in American University.

By William T. McClement,
Professor of Chemistry in American University.

Infinite in All Nature.

By A. V. E. Young.

Professor of Chemistry in Northwestern University.

BELIEVE that the most satisfactory view of nature is given by him who sees therein the handwork of an Infinite God.

By P. S. Henson.

By P. S. Henson.

That the facts of physical science would prove the existence of God to a man not otherwise disposed to admit the possibility of intelligence superior to his own is a proposition I am not prepared to maintain. And doubt if scientific learning, however extensive, would alone make a man prayerful.



By John M. Coulter.

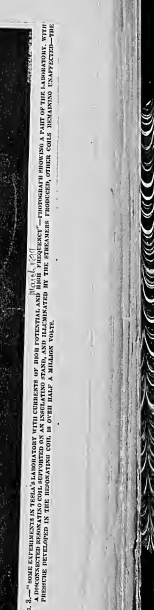
HAVE read with interest the claim made by Mr. Polisson that chemistry proves

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By A. V. E. Young.
Professor of Chemistry in Northwestern University.

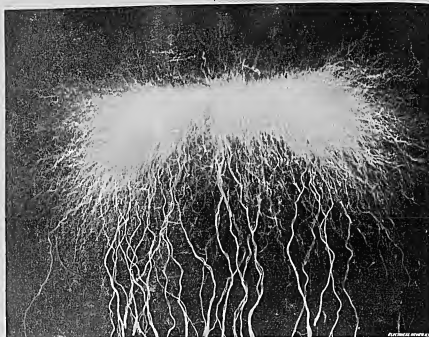
BELIEVE that the most satisfactory

...the existence of God to a man no
wise disposed to admit the possibility of



2. A new experimental technique was developed in the laboratory with elements of high potential and high frequency—photographing a part of the laboratory with a synchronized illuminating coil, and illuminating in the streamer produced, other coils having an unaffected—phosphor developed in the resonating coil, in half a million volt.

3636



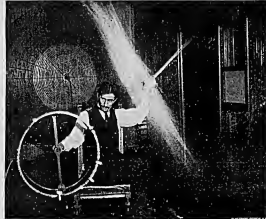
6. 11.—TRANSFORMATION OF AN ACTIVE TERMINAL OF AN IMPROVED ELECTROLYTIC CELL IN TOLAN'S EXPERIMENT FOR TRANSMITTING ELECTRICAL ENERGY TO GREAT DISTANCES WITHOUT WIRES—VIEW OF BATHING TUBE IN 15 FEET—THE PHENOMENON OF THE TERMINAL IN SHORT CIRCUIT BEING TAKEN.

3635



FIG. 6.—EXPERIMENT ILLUSTRATING THE ACTION OF A HYPERBOLIC CURVE PRODUCED BY WATER TRANSMITTER FROM A DISTANT, ISOLATED, IN THE CASE OF

3636



5.—TOLAN'S EXPERIMENT IN TOLAN'S EXPERIMENT WITH CURRENTS OF HIGH POTENTIAL AND HIGH FREQUENCY—"THE OPERATOR'S BODY, IN THIS EXPERIMENT, IS CHARGED TO A HIGH POTENTIAL OF SEVERAL HUNDRED VOLTS, AND THE WATER TRANSMITTED TO IT FROM A DISTANT, ISOLATED, AND A SECONDARY, THE WATER IN THE HAND IS LIGHTED TO GREAT BRILLIANCE BY THE ELECTRICAL CHARGES CONVEYED TO IT THROUGH THE BODY."

DEPOSITING COPPER WITH HIGH CURRENT DENSITY.

A very suggestive exhibit, and one full of promise, was that of Mr. J. W. Swan, shown at the recent Royal Society Show. He showed specimens of electrolytic copper, exceedingly hard, brilliant as mirrors, and yet deposited under a current density of 144 amperes per square foot. This astounding result is obtained by adding to the acid solution of sulphate of copper, a minute quantity of collodion, added to each hundred parts of copper solution, and the effect could be readily followed. The process is carried out at a temperature of 15 deg. to 30 deg. Cent., and the current is applied intermittently, 14 seconds on and 16 seconds off. If continuous, a coat of collodion forms on the plate and insulates it. Sheets were shown of this bright copper, and were revealingly elastic, while their application to effect the bright deposit of nickel, and so dispense with the scratch-brush and burnishing processes.

3637

A commercial innovation of the electrical engineer, which has been in use for some time, has been brought forward by Charles Chase of Fall River, Mass.—the process of depositing copper on a surface by means of a solution of copper in a solution of sulphate of copper. The liquid or acid can be used in any way, and when the acid is added to the solution it will cause the copper to be deposited on the surface. The process is carried out at a temperature of 15 deg. to 30 deg. Cent., and the current is applied intermittently, 14 seconds on and 16 seconds off. If continuous, a coat of collodion forms on the plate and insulates it. Sheets were shown of this bright copper, and were revealingly elastic, while their application to effect the bright deposit of nickel, and so dispense with the scratch-brush and burnishing processes.

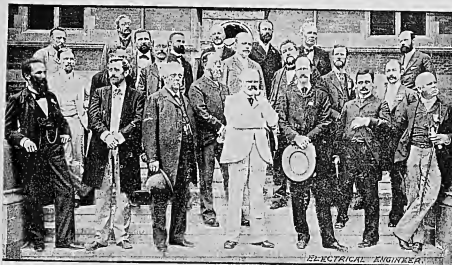
[pt. 13, 1893.]

3638

THE ELECTRICAL ENGINEER.

3638

London. Manchester. Birmingham. Leeds. Liverpool. Glasgow. Edinburgh. Dublin. Cardiff. Plymouth.



THE CHAIRMAN OF DELEGATES AT THE ELECTRICAL CONGRESS, 1893.

3639

THOMAS A. EDISON, PRESIDENT.

SAMUEL INSULL, Vice-President.
W. S. PERRY, Treasurer.

THOMAS BUTLER, Secretary.

CHARLES BACHELOR, Treasurer.
GEORGE MERRILL, Secretary.

NEW YORK CONCENTRATING WORKS,

GENERAL OFFICES:
EDISON BUILDING, BROAD STREET.

NEW YORK.

BURNED-OUT INCANDESCENT

SEND US YOUR BURNED-OUT LAMPS.
WE REPLACE THE FILAMENTS.
THIS IS OUR SPECIALTY.

SEND FOR CIRCULARS.

DAVIS ELEC. WORKS,



3648

LAMPS RENEWED.

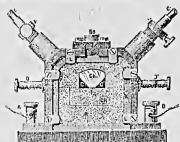
REDUCED RATES TO CENTRAL STA-
TIONS THAT SEND US OVER 500
LAMPS PER MONTH.

1893 WRITE FOR PRICES

SPRINGFIELD, MASS.

New York Office: BUSHNELL & CO., 35 Broadway.

A LABORATORY ELECTRICAL FURNACE
The accompanying illustration shows a convenient form of
laboratory furnace designed and made by Messrs. Ingersoll &
Lyon, of Paris. The block of fusible, etc., is in the crucible,



A LABORATORY ELECTRICAL FURNACE.

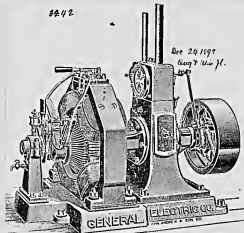
which can be taken out at will. The carbon, etc., can be
moved by the screws, etc., or, by being pushed out after shaking
the set screws, etc., of the terminals. The experiments can be
watched, as the ends are covered in by nich, held by the clamp
1, fastened to the metal frame-work etc. This furnace will work
with a current of 10 volts and 12 amperes. According to the
Graphic Civil, from whom obtains the particulars and illustrations
were taken the furnace works admirably.

3649

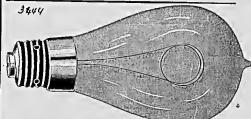
EDISON'S NEW LAMP.
Electric Light Co. 1893
By 11th & 12th Ave. Tenth City, New
York, N. Y.

Announcement in regard to Thomas A.
Edison has succeeded, according to the Elec-

trical Review, in developing a new kind of
electric lamp or incandescent lamp by means of
which the incandescent X rays are turned into
pure white light. Edison's new lamp is an
ordinary incandescent lamp, such as the incandescent
lamps, which is made of a new substance
in the shape of a cylinder, through the spec-



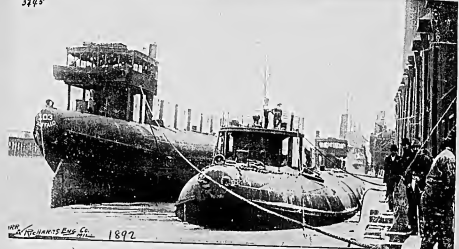
DIRECT COUPLED GENERATOR AND ENGINE.



Try the effect on COILED
your patterns of using
the
"BUCKEY"
FILAMENT
LAMP.
HANDSOME,
HIGH GRADE,
HAS NO EQUAL.
1893

THE BUCKEY ELECTRIC CO., - Cleveland, O.
CHICAGO: 427 The Buckeye. NEW YORK: 49 Bay Street.

3650



WHALEBACKS—LIGHT AND LADEN

3656




WHALEBACK STEAMER "TULLISHUY."

3657

[illegible]

to lay in New York city, and the same transportation company is to be solicited as the electric power source.



VIEWS OF THE HOPE DIAMOND.

To begin with, it is the only large blue stone known to the jewellers of to-day worth its karats. There is no amount of tints falling from it to the WH karats of the French blue stone. The French blue stone comes next to it alone among the species of diamond. And the Brunswick stone itself believed to have formed a part of it, but we are anticipating.

The history of the Hope Diamond is full of bewildering romance, marvel and mystery. Let us begin at the beginning. In the 16th the famous traveller and jeweller, Josephus Traveller, came back to Paris

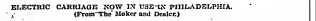
3266

[illegible]

THOMAS STEVENS

41.50

3048



1

by a cable along the side of the canal. This runs like a trailer-wheel truck run along on a A. S. S. wire connected to the canal boat motor. If current is to be obtained

came in itself—one of the "cell." Into lithium put at normal temperature is heat and raising the temperature of 200 degrees had a liquid electrolyte.

elements of his
acid, which
solid. Applying
the moderate
fused. He now

But sure these apparently non-cooperatively are naturally thrown on active discharge coil as opposites. With this we limit to the spark

...easily ob-
...sensitivity to forty
...exposure of
...not only the
...eye, the chin

1000

...with the greatest ease, with which the person is
...with the greatest ease, with which the person is
...with the greatest ease, with which the person is

This route has a trolley-wheel truck running on it. A flexible wire connects it to the canal boat motor. If current is to be obtained

GAS in itself was a
"cell." Into this, he p
at normal temperatures
heat and raising the
temperature of 200 deg
had a liquid electroly

elements of his
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t food. He saw

ME: But since these applications are only a comparatively small number, we are naturally thrown on the resources of the disruptive discharge coil as the only apparatus. With this, we can only go back to the state of the body.

NOTED.
asked is easily ob-
of twenty to forty
into an exposure of
early met only the
of the era, the chie

He scooped the look an iron pot, which became in itself one of the elements of his "cell." Into this he put caustic soda, which at normal temperature is a solid. Applying heat and raising the mass to the moderate temperature of 300 degrees it fused. He now had a liquid electrolyte.

"I have the impression that results in Europe have been through the employment of a static or Ruhmkorff coil. But since ours can produce only a small potential, we are natural to the use of the disruptive discharge, the most effective apparatus there is practically no doubt.

pressure quickly estimate, waste water exposure of from one to six and a half hours the ribs, shoulder bones and bones of the upper arm appear clearly is shown in the upward part. It is discolored beyond any doubt that is metallic silver or long or chalky does not be infrequently detected in any part of the body.

ATTACHED EFFECTS NOTED.

"An outline of the skull is easily obtained with an exposure of twenty to thirty minutes. In one instance an exposure of four minutes gave clearly not only an outline but the appearance of the



At an inch thick, while in showed that the rays were not all. The exposure the same in each case, all the other conditions

people turn away disappointed. Therefore at present I deem it best not to add anything to the article just published in the Electric Review. I shall wait until I have something to report that will approximately meet our tenacious expectations of the public."

to remain has nothing
der to be certain
unapplied.


broader view of the
he is not guilty of

the experiments are

[illegible][illegible]

Development of Growing Plants Entirely Stopped When Exposed to Blue Light.

[From the European Edition of the Herald.]



In the course of these studies we thought it interesting to investigate the peculiar action of the sun on vegetation, which is a transformation of the solar energy. Whether are the rays of the spectrum which act most efficaciously? It is possible to distinguish the luminous rays from the calorific rays and the chemical rays, to seek the characteristics which distinguish the slow radiations of the red and of the spectrum from the rapid radiations of the violet end, and to ascertain which are those that exert the most favorable influence upon certain phenomena of vegetable life.

We thus constructed, side by side and in the same meteorological conditions, three frames—red, green and blue—in which we placed an transparent white glass to enable us to compare the effects of full sunlight. In order to render the conditions as natural as possible and avoid too high a temperature the frames are ventilated by a current of air passing from south to north, but the light from outside cannot enter the colored frames, even by reflection.

Among the many results which we obtained, it is interesting to mention the observations which we made on sensitive plants, which were chosen as subjects of experi-

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Felammario

theatroscope, by which moving life size figures of men, women and animals are thrown upon a screen by means of bright lights and powerful lenses. The trial of the new machine was made last night in a cold corner of the big frontier at the warks, and Mr. Edison, with Richard N. Dyer, William Z. Otis, manager of the phonograph works; Ruff and Gammon, of New York, and a few invited guests; huddled around a red hot stove and gazed at and admired the marvellous figures thrown upon the big white screen at one end of the room.

The feature of the new machine which astonished all who saw last night's views was the almost entire absence of vibration in the pictures as they appeared on the screen, and words were heard to be uttered in surprise in perfecting the apparatus.

MANIFESTED SIX HUNDRED TIMES.

The original photographs as by the kinesiograph and developed on the film roll are about the size of a special delivery postage stamp, and to produce a life sized picture they are magnified about six hundred times. Of course each frame of the film or the apparatus which revolves is magnified in like proportion, and every previous attempt to do away with this vibration had been unsuccessful.

Recorded Volume of Sound Will Be Magnified
so Each Actor's Speech Will
Be Heard.

F DISON'S vitanoscope, the latest thing on the vaude-

Evillo stage, and a triumph of the Wizard's inventive genius, is a simple contrivance, and yet wondrous in its detail and mechanism. When Edison named the machine

The vintscope has been called an enlarged kitescope. It is more than that; it is an improved kitescope. Kilson worked on it for several months, and after spending fully \$25,000 on his experiments threw away his machine; he had perfected and started ones in the machine shop, but used it only on the principle of the one used in the kitescope. But it gave kitescope effects, and those he didn't want. So he dispensed entirely with the shutter in the vintscope and secured the vintscope effects by the use of lenses and an eye glass.

Thus the animated, miniature picture, taken by the kineoscope, reproduced life as it really is. It is the mirror of the mirror. The first picture Edison produced by means of the vitascope is the picture of the wife of the village doctor, who is sitting in a rocking chair in the parlor of the village estate. She went in the Wizard's laboratory in West Orange, N. J., and saw the picture of her own face on a vitascope as she sat before the kineoscope. In every movement her face was reflected on the kineoscope, and when she opened her eyes to the kine she wrote to the Wizard when she finished. "Gillies, I am the first woman who has seen her own enlarged counterpart on a screen. He was delighted with the result—it was the prettiest thing I have ever seen." The picture was put on the film. In the reproduction, there was an almost total absence of the vibration so noticeable in the original. The picture's maintenance made the picture seem all the more natural.

The light thus focussed on the frame is very intense, and if allowed to rest for moment on the film would melt it. The image, being in the way, cuts off the light. When the electrical current is turned into the viascope, and its wheels carrying the film are set in motion, the dynamo is also charged and the image is drawn to it.

Then the light is not focused on any particular film for a moment and the latter is not melted. When the current is cut off the vineoprobe the magnet falls from the dynamo in its place. In front of the frame and the winding of paper reflecting the film from destruction is required.

As stated, the films now used in the exhibits of the vineoprobe are each fifty feet in length, but they are to be improved shortly by films from 100 to 200 feet in length. These films are not being taken, as we have known them are Niagara Falls, a steamship going down the Lachine Rapids and an ocean going ship leaving her plor with her deck

Preparations for General Introduction
of the New Illuminant. 1891

Acetylene gas, the now abundant, a description of which was printed in the *Evening Post* several months ago, will soon be an actual use, although matters connected with proprietary interests are still engaging most of the attention of the men who have it in charge. The present company, which has the rights for acetylene gas, as made from calcium carbide by the next process, has disposed of all of the rights throughout the country except in a few states, and with the greatest exception of the lighting privileges for military cars. One company has secured the metropolitan rights for the "Greater New York." It will probably be next winter before the general public here will get any of the advantages of the new method of lighting.

A Favored Few Treated to an Exhibition of the Inventor's Most Recent Production.

Horizontal distance = 1000 ft

Size Figures, *Ape 4*
150 lb.

THE KINETOSCOPE PERFECTED

Be Heard. 3509

DISON'S vinascope, the

genius, is a simple contrivance, and yet wonderful in its operation.

gross in its design and mechanism. When Ed-
son named the machine

ANOTHER experiment in the use of light rays was made by Professor J. J. Thomson, who has been working on the subject of the cathode rays for some time. He has found that these rays are composed of negatively charged particles, which he has called "corpuscles." These corpuscles are very small, and their mass is about one-thirtieth that of a hydrogen atom. They are also very fast, moving at a velocity of about 100,000 miles per second. Thomson has also found that these corpuscles are deflected by magnetic and electric fields, which is evidence that they are charged particles.

THE MARVELLOUS NEW PHOTOGRAPHY. The Marvellous New Photography, as it is called, is a new method of taking pictures. It is based on the principle of the "photoelectric effect," which is the process by which light can cause the emission of electrons from a metal surface. This effect was first discovered by Heinrich Hertz in 1887, and it was later explained by Albert Einstein in 1905. The new photography uses this effect to create a picture. A beam of light is directed at a metal surface, which causes electrons to be emitted. These electrons are then captured by a photographic plate, which creates a picture.

3514 JANUARY 10, 1898—CONT'D THE NEW PHOTOGRAPHY.

FURTHER MYSTERY OF PROF. THOMSON'S GREAT DISCOVERY. The strange manner that Professor Thomson has proceeded in his experiments has attracted much attention. He has refused to publish his results, and he has also refused to allow anyone to see his apparatus. This has led to much speculation and controversy. Some people believe that Thomson is hiding something, while others believe that he is simply being cautious. The truth is, of course, that Thomson is a very careful and thorough scientist, and he is not likely to publish anything unless he is sure of it.

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3515 "DAILY TRIBUNE, SUNDAY," MARVELLOUS DISCOVERIES. NEW KINDS OF PHOTOGRAPHY. PICTURING YOUR DREAMS AND YOUR FLESH.

SUBSTANCES CAPABLE TO LIGHT AND ELECTRICITY PENETRATED BY A HITHERTO UNKNOWN THAT AFFORDS A SENSITIVE FILM. The wonderful announcement was made a few days ago that a German scientist had been able to photograph the human eye. This is a truly remarkable achievement, and it is one that has attracted much attention. The scientist, whose name is not yet known, has used a new kind of photography to create the picture. This new photography is based on the principle of the "photoelectric effect," which is the process by which light can cause the emission of electrons from a metal surface. The scientist has used this effect to create a picture of the human eye, which is a truly remarkable achievement.

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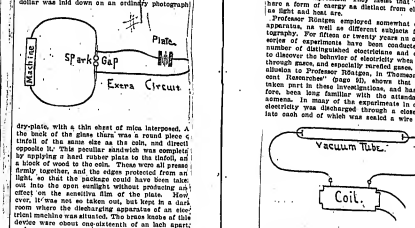
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3516 NEW LIGHT AND SURGERY. SUGGESTION FOR THE OF OPERATIVE MEDICINE.

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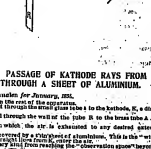
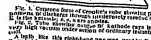
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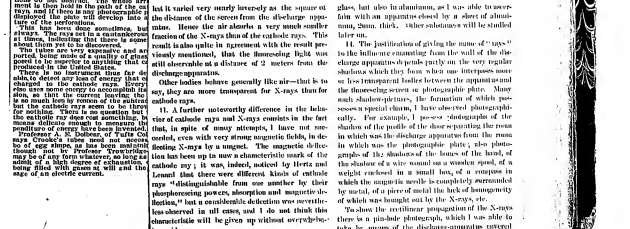
Fraser's Magazine - Maxwell's Great Treatise - The Hittites - Microscopical Views - The Observed Facts and the Cause of the Hittite Hieroglyphs.

The strange photograph in effect which HOLT has discovered here the public again come to learn with the modern theory, the electro-magnetic theory of light, a theory of which Fraser was the prophet, Clerk Maxwell the promoter, and Hertz the demonstrator.

The new theory of light was established early in this century by Young and Fresnel. This theory declares that all space through which light travels is filled with a medium, to which he has sometimes called ether, or simply aether, and that all light passes through this medium by means of transverse waves. But, in the case of light, the waves are not in the plane of the particles of the ether transmitting the light is everywhere at right angles to the direction in which the light is travelling.

This figure gives a good representation of the

[illegible][illegible][illegible][illegible][illegible][illegible]



"X" RAYS AT YALE.

Students at the University Grawl Through Windows to Hear Professor Wright.

FACULTY IN THE THROG.

Several New Theories Advanced Concerning the Cathode Rays and Their Effects.

CHEMIST IS GIVEN TO LEXAND.

Shot in a Rabbit Shown in a Lantern Slide by the Lecturer.

Feb 12 1896

On Wednesday night, Feb. 12, 1896, the great lecture in the recent discovery of the use of cathode rays in photography was given at Yale University this evening in a most unique way. Arthur W. Wright, professor of experimental physics, who is to charge the laboratory, and who was the discoverer of the cathode rays, delivered a lecture in the Laboratory on "Cathode Rays."

The lecture was given in the hall of the Chemistry building, where the members of the faculty who could spare the time were present. The lecture was given in the hall of the Chemistry building, where the members of the faculty who could spare the time were present. The lecture was given in the hall of the Chemistry building, where the members of the faculty who could spare the time were present.

Professor Andrew Phillips, seeing that the lecture and their friends would be able to get in, tried to get in, but was not allowed to enter. The lecture was given in the hall of the Chemistry building, where the members of the faculty who could spare the time were present. The lecture was given in the hall of the Chemistry building, where the members of the faculty who could spare the time were present.

When Professor Wright came into the lecture hall, he was greeted by a large number of students. The lecture was given in the hall of the Chemistry building, where the members of the faculty who could spare the time were present. The lecture was given in the hall of the Chemistry building, where the members of the faculty who could spare the time were present.

From this last remark it will be seen that Professor Wright's lecture was a most successful one. The lecture was given in the hall of the Chemistry building, where the members of the faculty who could spare the time were present.

NEW ROUTE TO X RAYS.

Dr. W. J. Morton's Experiments in Search of the Queer Light.

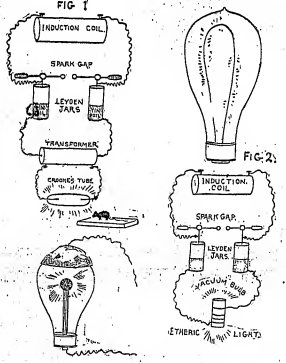
Yale Review Feb 10 FINDS A WONDROUS BALANCE.

A Field of Electrical Excitation Produced in the Space of a Wire Rod.

POTENTIAL OF THE FORCE IN SORORITY.

Simple Lines Upon Which Animate. May Work in the New Field of Scientific Research.

The interest for developments seemed other through intent or accident by no means. The interest for developments seemed other through intent or accident by no means. The interest for developments seemed other through intent or accident by no means.



DR. W. J. MORTON'S ARRANGEMENT FOR CATHODE RAYS.

collimator and screen as in the London Convention of 1895. The interest for developments seemed other through intent or accident by no means. The interest for developments seemed other through intent or accident by no means. The interest for developments seemed other through intent or accident by no means.

Thanks the Professor. The method of taking the picture of the cathode rays in the space of a wire rod is a most successful one. The method of taking the picture of the cathode rays in the space of a wire rod is a most successful one.

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A great many studies have been made with the cathode rays. The interest for developments seemed other through intent or accident by no means. The interest for developments seemed other through intent or accident by no means.

of the vacuum flask, it is seen that certain effects are produced, but the interest for developments seemed other through intent or accident by no means. The interest for developments seemed other through intent or accident by no means.

A peculiarity of the general behavior of the vacuum flask is that when the interest for developments seemed other through intent or accident by no means. The interest for developments seemed other through intent or accident by no means.

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NO BRAIN PICTURE.

Mr. Edison Will Not Attempt One Until Satisfied with His Preliminary Experiments.

HE MAY TRY IT TO-DAY.

Devoted Yesterday to the Preparation of Tubes That Will Give the Brain Picture. Had Feb 10 1896 LAYSH SKELETONS FURNISHED.

Professors at Trinity College Make Some Interesting Experiments with Sinking Rods.

The fact that previously was the large body of the brain picture was made. The interest for developments seemed other through intent or accident by no means. The interest for developments seemed other through intent or accident by no means.

Mr. Edison was so interested in the experiment, that he would have no personal interest in the experiment. The interest for developments seemed other through intent or accident by no means. The interest for developments seemed other through intent or accident by no means.

Mr. Edison has previously decided on the kind of tube he will use in the brain picture. The interest for developments seemed other through intent or accident by no means. The interest for developments seemed other through intent or accident by no means.

There was a great deal of interest in the experiment. The interest for developments seemed other through intent or accident by no means. The interest for developments seemed other through intent or accident by no means.

When the Wilson was lost of the woman's...
 ...the Wilson was lost of the woman's...
 ...the Wilson was lost of the woman's...

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When the Wilson was lost of the woman's...
 ...the Wilson was lost of the woman's...
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PHOTOGRAPHED SKELETONS.

Faculty at Trinity College's Brain Department Will Fail.

It is estimated in two human brains...
 ...It is estimated in two human brains...
 ...It is estimated in two human brains...

It is estimated in two human brains...
 ...It is estimated in two human brains...
 ...It is estimated in two human brains...

MATHEMATICS IN PHOTOGRAPHY.

New Professor Finds a Bullet in a Head.

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 ...It is estimated in two human brains...
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TO CONCENTRATE RAYS.

Dr. Kelle Working on a New Version to Edison's Successful Experiment.

Dr. K. Kelle, of No. 101 North Avenue...
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EDISON SENDS RAYS THROUGH OAK LOGS.

Developing the Most Extraordinary Penetrating Powers with His Tubes.

Professor Pupin Photographs the Shot in a Wall Near Yer's Head.

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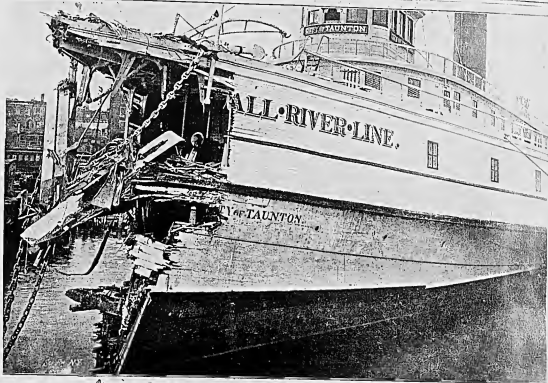
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Charles Batchelor Scrapbook, Cat. 1328

This scrapbook covers the period 1901-1914 and contains clippings about a variety of subjects. Included are items relating to aerial navigation, high-speed locomotives, and serious train accidents. One clipping deals with a Massachusetts Institute of Technology alumni dinner featuring "liquid sunshine," at which guests drank cocktails containing radium. Also included are political cartoons and a map of the Panama Canal. In addition, there are photographs depicting the aftermath of the 1906 San Francisco earthquake; Commodore Robert E. Peary's arctic exploration; the construction of New York's Manhattan Bridge; the New York ceremonies held in honor of the U.S. forces lost during the 1914 capture of Veracruz, Mexico; and the severe flooding that crippled the Paris region in 1910. The pages are unnumbered. Approximately 130 pages have been used. The clippings are individually numbered 1-267. Several loose items have been inserted into the scrapbook.



News & Mail, N.Y.

THE BOW OF THE "CITY OF TAUNTON."



THE "PLYMOUTH" AFTER HER COLLISION WITH THE "CITY OF TAUNTON."
THE COLLISION OF TWO LONG ISLAND SOUND STEAMERS



Inquest Is Begun on Grand Trunk Disaster—Despatcher Gives Evidence.

WYOMING, Ont., Monday.—Inquest into the wreck on the Grand Trunk Railway at Wainstead, which cost twenty-eight lives, began to-day.

Despatcher James Kerr, who sent the train from London, said he wired to the Watford and Wyoming operators simultaneously to have the express meet the freight at Wainstead.

Soon afterward Wyoming reported that the freight was slow in getting out. Kerr then called Watford and asked if No. 5 was coming. Watford's reply being "Yes," Kerr said, "May I hit it?"

Wyoming then reported the freight pulling out. Kerr said: "Let her go." He then called the Watford operator, who reported No. 4 had gone. Kerr then called Wyoming and told him to stop the freight. Wyoming acknowledged the order.

Andrew Carson, the Watford operator, at whose house is laid the responsibility for the accident by the Grand Jurors officials, followed Kerr's lead. Carson, he was reported cool and unflustered. He said he saw neither the two trains to cross at Wamsutter, he said, and displayed his order book to stop



express. Some 200 ft after he heard Wymann yell out of the delay to the freight and then the freight brakeman, whether called the witness and not the freight brakeman, said "Look out, the engine" preceding the "blast it."

Q. And the witness and the engineer and the conductor asked for his order; but the witness said that it was an accident and gave the conductor the order to stop.

W. C. Wymann, engine driver, who is the witness, said that he did not see the freight train stop the freight. I stated that I did not see the freight. I rushed out of doors with a lantern and saw the freight train stop. The engineer signaled the rear brakeman to stop and

called to him. I thought he heard me, as he gave the stop signal. I then threw my stop signal, which is a semaphore about half a mile back.

Conductor Graham, of the freight, said, "My rear brakeman signaled to stop, and the freight train stopped." The witness, Wymann, the sophomore, was not at the freight train when it stopped.

Harless, rear brakeman of the freight, testified—

Q. Now, on top of the caboose, and saw the train stop. I signaled ahead.

A. Yes, the freight brakeman and conductor answered.

3 FRENCH AIRSHIPS TAKE LONG FLIGHTS

Successful Trips of Lebaudy
Steerable Balloon and of
"Santos-Dumont No. 9."

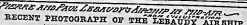
ROUND CATHEDRAL SPIRE

**M. Juchmes Flew to Mantles and
Returned to Starting Place
Against the Wind.**

PAID AN OFFICIAL CALL

**M. Santos-Dumont Skipped Over Trees of
the Bois to Get Permit from**

May 9 ————— 1903
[SPECIAL CABLE TO THE HERALD.]
HERALD BUREAU,
No. 6 AVENUE DE L'OPERA,
PARIS, FRANCE.]



Morgan T. Carnegie sailed
on the Cedric yesterday.

MORE AND LESS

The Herald's European edition publishes the following:—

There was little air in Paris this afternoon, but what little there was was conquered by M. Santos-Dumont, who went out in his air ship "No. 2," and simply handled it at his own sweet will.

M. Santos-Dumont related his exploit to the HERALD correspondent as follows: "There was quite a crowd outside my little party at Neuilly at about four o'clock, when I gave the words 'Let go,' and, looking down and behind me, I saw automobile carriages, motorcycles and bicycles following my course. My three and a half horse power motor airplane worked admirably.

"When I arrived and descended at Nagatsubo, a 'garde' came up and asked me if I had permission to cross the Bois in an airplane. I looked at him in wonderment, but sitting up the snorter at once, I replied: 'I haven't any on me, but I'll just call on M. Forestier, the Conservator of the Bois, in a few minutes' time.' The 'garde' doffed his kepi and said that there was no hurry an

"Coming down close to Suresmes Bridge I called upon the chief magnate of the Bois de Bauleigne, M. Frenetier, but he was absent. His secretary, however, received me courteously and said that as I had made a lawful request I was at liberty to circumnavigate the wood in every direction as long as I did not infringe the existing laws which forbade breaking branches of trees or

"Keeping at an altitude of about fifty metres I skimmed above the trees and did not worry about nature's lower growths. "When I saw storm clouds gathering I made a beeline for home and descended as quietly in my grounds as I had ascended.

"I am delighted with this little toy machine. The pleasure of riding in it is indescribable. Yesterday I turned it at my will. Automobilism is not in the same street with it. I shall not go out to-morrow, but perhaps I may have a fly on Sunday afternoon."

"My new balloon," *Bates Dumont No. 19*, will be ready in less than a month. It is molding arrangements to carry twelve passengers and two engines. I have the greatest confidence that it will prove a success."

At Juchmes, the aeronaut of MM. Loubaudy, also made a long excursion in their new airship. The following is M. Juchmes' account of his journey:—

"I left with Rey, the mechanic, and 150 kilograms of ballast. I did not take more than heavy rain had weakened the airship to the extent of ninety kilograms. The screws were turning at the rate of 550 revolutions per minute. We went in the direction of Saint Martin, La Varenne, Deunomant, Brédaunt and Marée.

"Entering the town from the western side, we made the tour of the cathedral, passed the Luxembourg, and returned to the railway station at Montec.
"At this point the wind becoming strong at the height of 150 metres, I increased the revolutions of the screw to 1,500 a minute. I then easily moved against the wind and ascended for the Château de Roncy. On arriving at the park I manoeuvred the airship in every direction. It obeyed its helm perfectly. Then I ascended for the balloon shed at Moisson. The landing took place just before the door, and the airship was put into the shed without any trouble."

"The journey may be summarized thus: Start in rain at fifteen minutes to nine A. M.; route, Malson, Lavacourt, St. Martin, Denecourt, Passicourt, Montes, Limoy, Ronay, Sandrancourt, Mericourt, Meusecourt and Melson, landing at half-past ten A. M. evolutions above Limoy, Montes and Ronay distance covered, 17 kilometres (23 miles furiously) maximum.

"The altitude was 200 metres, and this altitude is exploited by the drying of the landscape when the rain ceased. From this moment the ventilator worked without stopping to replace the cooling gas.

"We were reclaimed by the population all about our route."

**Victims Stricken on Touching
Water in Pittsburg Street.**

PITTSBURGH, July 4.—In the progress of a
n terrific rainstorm to-day four persons
were killed at Forbes Street and Oakland
Avenue by getting into a pool of water
charged with electricity. The victims were
Giuseppe Benda, twenty-one years old; Mrs.
Francesca Statti, fifty-four years old; Giuseppe
Statti, her son, twenty-two years old,
and Joseph Wine, forty years old, address
unknown to the police. All except the
last mentioned lived at 1,031 Webster Ave.
and were of the Italian nationality.

A large American flag surrounded from a grocery store at the corner where the accident happened, became soaked with the rain, and the high wind blew it against an electric light pole which was carrying 2,000 volts. The wire snapped under the pressure and fell into the street, one end lodging in a pool of water, charging it to a high degree. The first one to fall a victim was Winsa, who was running for shelter from the rain. In crossing the street he stepped into the pool of water and fell as though he had been shot. His death was instantaneous.

Soon after that the Stottl family came driving along the street in a hurry. There were seven persons in the vehicle and the driver was hurrying to reach a place of shelter from the storm. As he approached the broken wire laundress of persons tried to warn him of the danger, but could not make him understand until too late. He tried to pull away, but one of the horses stepped into the pool of water and fell.

The occupants of the trolley immediately began to jump. The four who leaped from the side opposite the wire dropped safely, but the three on the other side jumped into the fatal pool and were shocked to death almost instantly. None of the large crowd who witnessed the accident could approach the victims until the current was sent off from the wire, and for a considerable time the bodies lay in the street.



The American Falls at the Normal Flow of the River



Copyright, 1904, by Orrin E. Dunlap.

To the Editor of The New York Times:

I have a lot of information, never before published, I believe, in regard to the famous yacht America, the original winner of the Grace's Cup that for over half a century has been a pleasing bond of contention between the United States, Great Britain, France, Germany, Italy, Spain, Portugal, and the United States, and England, which information I just at the present time I think may interest many of your readers. Many years ago, I came to the City of New York to reside, I was in the City of New York for some time, and I was in the City of New York and to what was then called North Oyster Bay, but now Nassau, and spent the Summer. While there I had the good fortune to be acquainted with the late William H. Furness, who was at the time living with his family at the old Vandewater Hotel at the bay where I also was stopping. Mr. Furness will probably be remembered by some for the great interest he took in the history of the nation of brook trout, he being the inventor of what was called the "trout club." He

[illegible]

Copyright, 1904, by Orlin E. Dowling.
The American Channel Looking Toward the Mainland from Goat Island. The People in the Distance are Walking up the Riverbed at Midstream, where the Rapids Usually Toss with Great Fury.

[illegible]



Washington. He was graduated from little college away up in the northwest corner of this State, and if old Hannibal never did anything else than send him the service of his country, then old Hannibal has shown her reason to exist."

[illegible]

press a skeleton
of his arms and
and in another
they appeared a
limited collection
of objects. The
of objects were
found were ex-
posed.

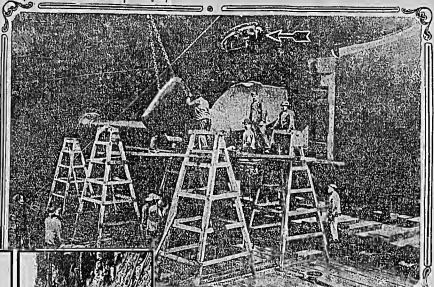
Mr. Gardner
sought to radium
by a new form
of paint. It was
then possible
to obtain the
radiation which
was then used to
called me up
that the new
is important
were said to be
indicated by this

Had in another
his health was
now he said
said at night
any other uses to
use.

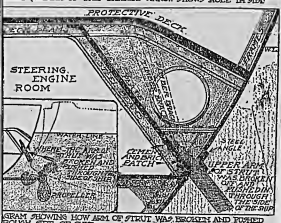
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Scars on the Illinois Seen in Dry Dock

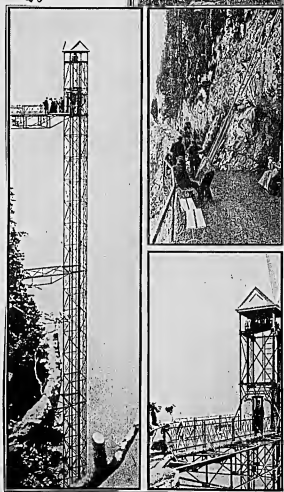
March 19, 1904



PORT QUARTER OF THIS MIGHTY GUNSHIP SHOWS SIGNS OF AGE



SHIP SHOWS LOW AND OF STEEL, WAS BUILT AND FORGED

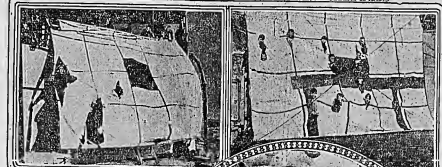


NEW ELEVATOR ON THE SIDE OF THE BUREAU—HIGHEST IN THE WORLD.

It is 370 feet above the level and extends to the top of the building. It is the highest elevator in the world.

Record of the Kearsarge's Big Guns on the Targets

TARGET SHOOTING, CONDUCTED BY THE U.S. NAVY, MARCH 19, 1904. RECORD OF THE KEARSARGE'S BIG GUNS ON THE TARGETS.



CREW OF THE 12-INCH GUNS

BEST SHOOTING IN NAVY'S HISTORY

So Rear Admiral Taylor Declares of the Record Made by the Kearsarge.

REMARKABLE BIG GUN WORK

Six Hits Out of Seven Shots Made in Five Minutes and Twenty Seconds with 13-Inch Projectiles.

REAR ADMIRAL TAYLOR, U.S. NAVY, who was in command of the Kearsarge, declared that the shooting of the Kearsarge's big guns on the targets was the best ever seen in the history of the navy. He said that the Kearsarge's big guns were the best in the navy, and that the shooting was the best ever seen in the history of the navy. He said that the Kearsarge's big guns were the best in the navy, and that the shooting was the best ever seen in the history of the navy.

STORY OF SHELLING OF PORT ARTHUR

Russian Officer Commanding a Battery Describes the Effect of a Bombardment.

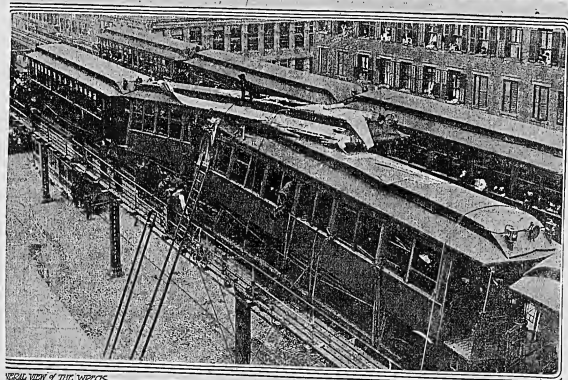
It was a clear, moonlit day and there was a gentle wind on the water. A little past midnight, however, the noise of the guns began to be heard. The noise was not far off from that of the guns of the Kearsarge. The noise was not far off from that of the guns of the Kearsarge. The noise was not far off from that of the guns of the Kearsarge.

looking in a protected rear and shells were hurled overhead with a jellish crash. The noise and dust lulled us. I did not experience excitement, and only that my teeth began to ache there was a strange sensation of continued amidst the scene of death, which had no terms after the first shell had exploded. Suddenly a white forced answer pointed to a battery of quick firing guns half way down the hill, which had been placed there to prevent a Japanese landing. I ran down and found the scene one of the wildest. There was a battle of iron shells and whistling from the sea, the smoke rising, the earth.

After the battle was over Lieutenant General (Barnes), commander at Port Arthur, placed the Cross of St. George on my breast. But what does it matter—I am in the hospital.

One shell had burst among the gunners. Soldiers were lying dead in its path. One gun had been broken. The rest were accurate.

Views of the Fatal Wreck on the Third Avenue Elevated Road



VIEW OF THE WRECK

Motorman Killed in Collision on Third Avenue Line After Warning Passengers.

CARS WRECKED, HANG BURNING ON TRELLIS

Rear Coach of Train Slipped Between Stations Is Telegraphed and Several Are Hurt

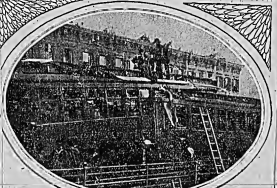
TRAFFIC IS BADLY BLOCKED

Growth and Platforms and Surface Cars and Police Reserve Are Called Out to Prevent Rioting

With a force which drove it first, on three-quarters of its length, into a car ahead, a coach bound north on the Third Avenue line of the elevated road crashed into the rear of a coach ahead of it which had been stopped at 125th street just before five o'clock yesterday afternoon. The contents of the second train were killed instantly and three passengers who were in the rear of the first coach were injured. The accident occurred on Greenwich street at a time when comparatively few persons are bound in that direction.

Thrown by the force of the collision from the train, the two cars tumbled far out over the street and fell, and the crowd gathered to see the wreckage and to help the injured.

Trains, a police superintendent of the Interborough road, declares that it could not have been possible that the brakes failed to work, if anything was wrong with the machinery.



which the electric current is turned on and the entire front of the car became a mass of twisted wreckage.

At the point where the two trains crashed together there is a view down the road, and the most probable explanation is that the motorman misjudged the time in making the stop and that the momentum of the train was so great as to prevent him from stopping in time. One of the passengers declared that the engine was stopped just previous to the crash and that of the wheels, with the brakes set, was sliding along the rails.

Thrown by the force of the collision from the train, the two cars tumbled far out over the street and fell, and the crowd gathered to see the wreckage and to help the injured.

"Move yourself!" he shouted to hold a horse passenger who was in the forward car with him, as he threw open the door of the compartment where he sat. "There a 'Tory' who he had warned. An instant later the car started forward and the horse passenger preceded the rear end of the train ahead.

At the rear, where the engine was at the time, the horse was not seen. It was supposed that the horse was not injured, but it was not seen. It was supposed that the horse was not injured, but it was not seen.

The failure to save a human life at the time of the accident was a tragedy. The motorman was killed, and the passengers were injured. The wreckage was a sight to be forgotten.



HOW IS THIS FOR A RAILROAD ACCIDENT? It occurred last month at Greenwich street, Double, Ireland. 1910



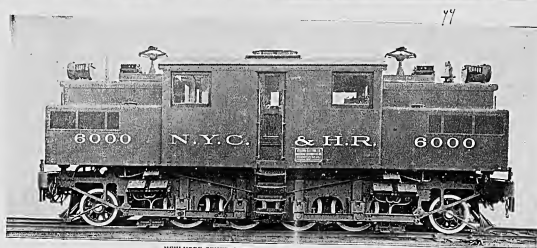
COL. WILLIAM C. GREENE. Col. Greene has been prominently connected with the... 1906



PROF. CONRAD WILHELM ROENTGEN. His discovery of the X-ray has revolutionized medicine and science. 1895



LOARD KELVIN. Who acted as a special engineer for the Atlantic, Pacific, Atlantic, and other lines. 1857



NEW YORK CENTRAL 6-TON ELECTRIC LOCOMOTIVE NO. 6000.



NO. 690 DOING SEVENTY MILES AN HOUR.



AFTER THE EARTHQUAKE IN CALABRIA, ITALY. Oct 1905

The temple of the church at Trione was so badly damaged that it was found necessary to pull it down. photograph shows it in the act of falling.



Continued from page 76
Hand of a patient
of Dr. J. H. Hurdman
June 1905

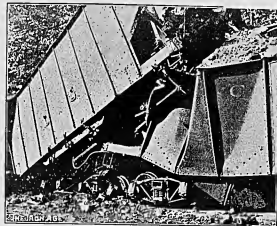


A CASE OF RAREFECTING OSTEITIS (No History Obtainable)

By DR. W. J. HURDMAN, Ann Arbor, Mich. Dec 1905



McLure.
FOOTBALL IN UGANDA, AFRICA. THE REAL "ALL BLACKS" ON THE GRIDIRON AT MT. ELGON.



Behavior of Steel Cars in Collision.

trains of loaded coal cars with a pusher locomotive at the rear headed toward the main line. The engineer of the pusher bearing the runaway train behind him and not having time to get under way abandoned his throttle. His locomotive was struck by the two locomotives attached to the runaway train. All three locomotives were completely wrecked, as was also a wooden box car immediately in the rear of the two runaway locomotives. The only other wreck in the runaway train was that shown in the picture.

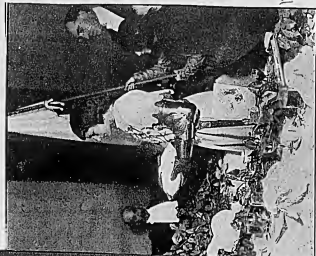
Between these two cars were three loaded wooden coal cars. The force of the collision drove the car shown at the left of the picture up and over the wooden cars completely demolishing them. The cars back of this point all of them built of steel were practically unharmed. When the car shown at the right of the picture was pulled away by the wrecking crew it was found that the wrecking of all three wooden cars was so tightly jammed under the other car that it was not only impossible, but almost impossible to remove it, and the car had to be thrown over on its side.

June One - Nov 1905 - 82

Behavior of Steel Cars in Collision.

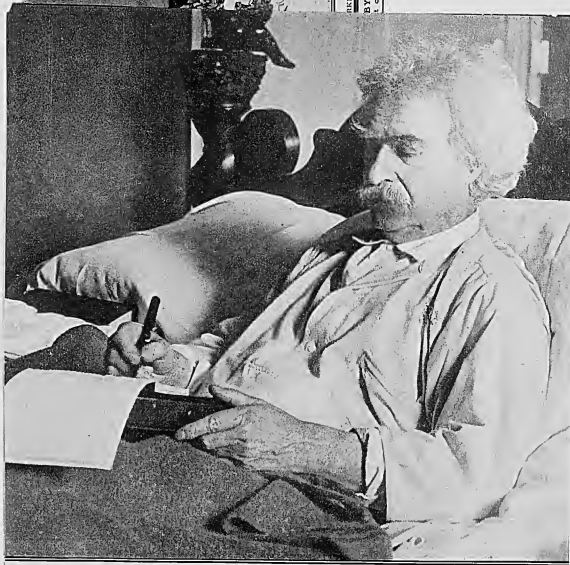
The accompanying illustration, showing the position of two steel coal cars in a collision, is from a photograph taken by J. S. Burrows, a member of the United States Geological Survey, who happened to be present when the accident occurred. The wreck occurred September 10 at Thurnham, on the Loop Creek branch of the Chesapeake & Ohio Railroad.

The cars shown were a part of a train of more than 20 cars, each loaded with about 50 tons of coal. The train, a double header, or, in other words, drawn by two locomotives, had crossed the summit of the Loop Creek grade and begun the descent when the air brakes refused to work. By the time the hand brakes were applied the train was coasting and with their firemen and other trainmen jumping in the ground at a point 15 miles from the place where the collision occurred. At the bottom of this grade a bridge spans New River, connecting the Loop Creek branch with the main line of the Chesapeake & Ohio on the north side of the river. Stumbling on this bridge was a line



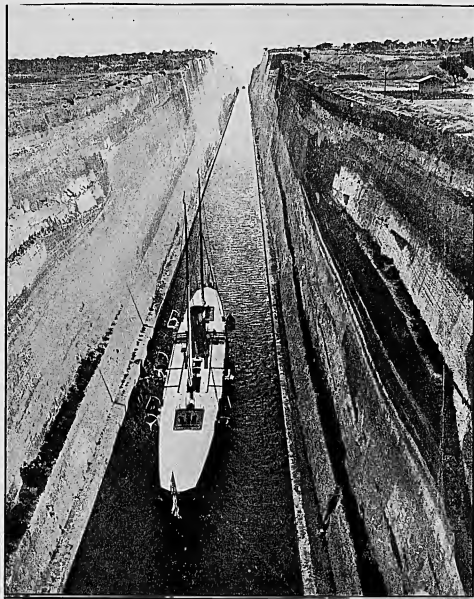
SEE - ROAD KILLER - MISS ANCHUTEN

BY THE SOCIETY OF ILLUSTRATORS
J. S. BURROWS - JOHN S. BURROWS
Illustrated by J. S. Burrows



Mark Twain does his writing in bed

Jan 14 1906

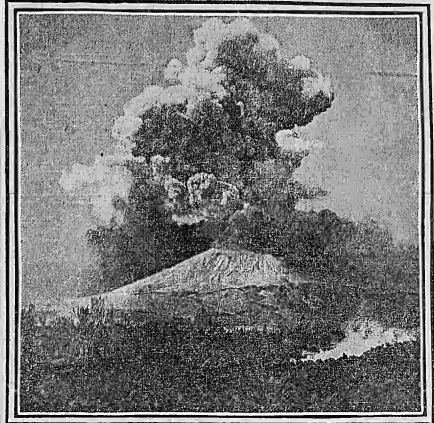


J. PIERPONT MORGAN'S YACHT "CORSAIR" PASSING
THROUGH THE CORINTH CANAL, GREECE. 1906 March.

(From Britannica, Copyright, 1906, by Underwood & Underwood, N. Y.)

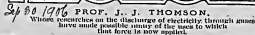
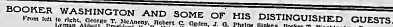
CRATER OF VESUVIUS POURING FORTH FLAME, LAVA AND SMOKE

Heads West 1866



Vesuvius in the Height of its Eruption

The above photograph was taken on April 18 after the cone had been considerably reduced in height from the successive eruptions, and shows that it presented a very different appearance from that of recent years, being much lower in diameter. The lava on the mountain side shows the deep stream which wholly destroyed several Italian towns.



JOHN W. GATES, *Sep 30*
during and successful business operator. Mr.
Gates' interest is chiefly in railroads, but his
venturesome disposition neglects
no promising opportunity. *1906*
—about 1904, he was engaged in the railroad, N.Y.





ALL THAT REMAINS OF SAN FRANCISCO'S CITY HALL.
The ruins as they are today. Leaven St. on left, Market St. on right.



PANORAMIC PHOTOGRAPH TAKEN FROM NOB HILL LOOKING EAST.
On the extreme left is Russian Hill. Next to it is Telegraph Hill, behind which lies North Beach. The large building on the right is the Fairmont Hotel. Across the street is the Hopkins Art Institute.



LOOKING EAST FROM THE CORNER OF BUSH STREET AND VAN NESS AVENUE.
In the centre stand the remains of the Flood Building; on the right the City Hall.



THE JEWISH SYNAGOGUE.
Sutter and Stockton Streets.



ST. JOHN'S P. E. CHURCH.
Folsom and Filmore Streets.



LOOKING NORTH ON MONTGOMERY STREET.
The Grecher-Woolworth and Union Trust Buildings.



THE GRANT BUILDING AND POST OFFICE.
Seventh Street, Between Market and Mission.



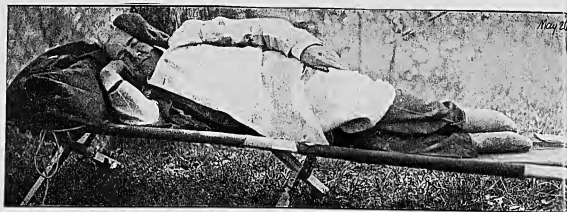
MARKET ST. RY. POWER HOUSE.
Corner of Valencia and Market Streets.



IN FRONT OF THE CALL BUILDING.
Stockton and O'Farrell Streets, Looking East.

120

HOW THOMAS A. EDISON TAKES A VACATION-



ON HIS WAY THROUGH VIRGINIA

122

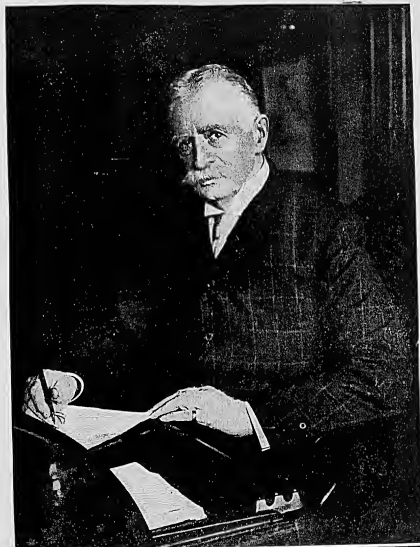


THOMAS ALVA EDISON -
Edison
Oct 23 1910
 Latest picture, taken at the house of the famous inventor and scientist.
 (Photo by Under-Wyke.)

123



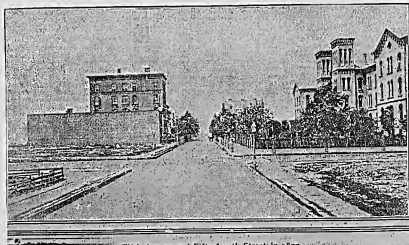
Vanuxem
Oct 1906
 PRESIDENT ROOSEVELT
 Delivering his speech.



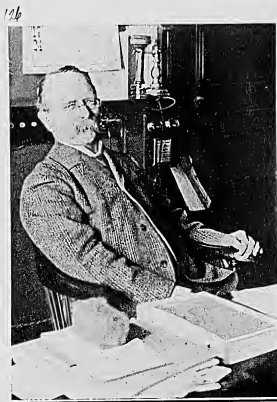
HENRY H. ROGERS.

Today one of the most impressive figures in the world of capital and industry. Mr. Rogers is believed to be the strongest influence in Standard Oil operations and his influence in the development of the oil industry is well known.

(Photo, Copyright, 1906, by Underwood & Underwood, N. Y.)



Fifth Avenue and Fifty-fourth Street in 1897.



JOHN P. HOLLAND, Inventor of the submarine boat, in his office. *Oct 1906*



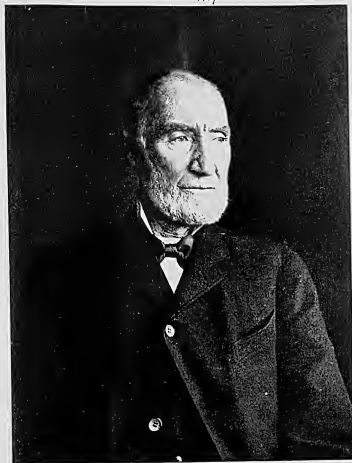
Oct 1906

PRESIDENT ROOSEVELT, soon photographed taking the ship with the eyes on board the Lusitania, although during the visit to the North Atlantic fleet.

128

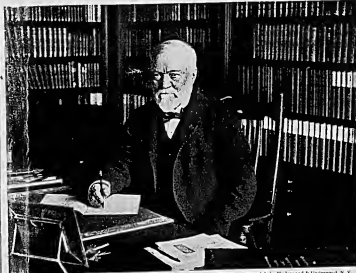


A photograph taken at the top of the Eiffel Tower, showing the new military balloon La Patrie sailing over Paris. The Arc de Triomphe can be seen at the left of the centre. *June 1907*



July 1906

JOSEPH H. CANNON



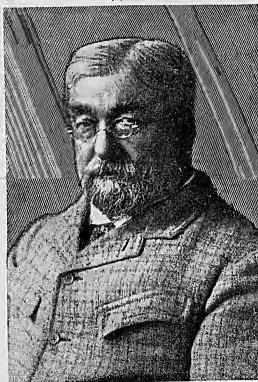
ANDREW CARNEGIE IN HIS STUDY, AT HIS HOME IN FIFTH AVENUE, NEW YORK. *Nov. 1908*
Mr. Carnegie explains the pictures in his statement that the recent financial success was due to Wall Street's well-timed agitation, and not to any action of the federal authorities.

130



THE STRANDED STEAMSHIP PRINZESSIN VICTORIA LUISE *Dec 6 1907*
On the beach at Kingston, Jamaica. The figures on the beach are the crew landing passengers and baggage from the wreck.

187



See SIR NORMAN LOCKYER 1896
The eminent English astronomer, whose many writings on the sciences are expected in translation.

186



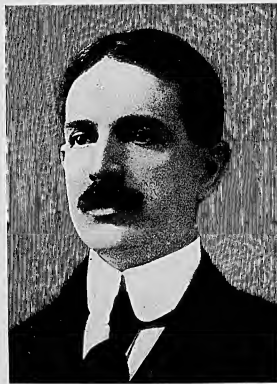
Albion SARAH RICHARDSON
From an early portrait. *See* 1897

188



See SIR WILLIAM CROOKES 1896
The well-known English physicist and chemist, inventor of the Crookes tube.

189



PROF. T. W. RICHARDS *See* 1896
Of Harvard University, who is to lecture at the University of Berlin this winter.

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THE IRON AGE

September 20, 1906

Amos Whitney.

Amos Whitney, one of the founders of the Pratt & Whitney Company, Hartford, Conn., and Mr. Whitney celebrated their golden wedding at Hartford, September 16, a great circle of friends joining in the festivities, which marked the important anniversary. More than 3000 people attended the reception given by Mr. and Mrs. Whitney at their residence, where they were cordially received by Mr. and Mrs. Clarence D. Whitney. Miss Whitney and George F. Whitney, Mr. and Mrs. Whitney were married in Hartford in 1833. Mrs. Whitney then joined Miss Laura Johnson, Clarence D. Whitney and Miss Nettie Louise Whitney are the surviving children.

Though approaching his seventy-fourth birthday, Amos Whitney still displays an active and important part in the industrial life of Hartford, after more than half a century of busy manufacturing experience. The corporation that bears his name is known the world over as one of the greatest of its kind. Its name has always been identified with machinery and mechanical tools as denoting a standard of excellence. The two great New England names of Pratt & Whitney and Brown & Sharpe have for years been linked together everywhere that metal is fashioned, and Mr. Whitney has the enviable and honorable distinction of being not only a founder of one of these great establishments, but also one of the men who have carried it through from a small beginning to its present position of the present day. He is still a director of the corporation, though taking a less active part in its management than he did up to a few years ago. His career is one of unusual interest and importance.

He was born in Rhode Island, October 8, 1832, of old New England stock. His father, Amos Whitney, was an expert locksmith and machinist. Amos Whitney received his early education in the village schools, and at 14 years of age was appointed to learn the machinist trade with the Essex Machinist Company, Lawrence, Mass., where his family was then residing. The shop was a large one for his day, manufacturing cotton machinery, housework and machine tools, and his apprenticeship was served on the latter work. He remained with the company for a year after the expiration of his apprenticeship; his employers were glad to keep him for he had become an expert at his trade. Then he followed his father to Hartford, in the Colt factory, where both were working as machinists in 1850. It was there that Amos Whitney and Francis Pratt came together, forming a friendship which was the foundation of their future business association. Mr. Pratt soon after went to the Phoenix Iron Works as superintendent. Mr. Whitney followed him in 1853, having a contractor's job which earned him \$5 a day for one month about \$2, however, he believed that the experience to be had in working on machinery would be vastly more valuable to him than that of plant manufacturing, and this decision was reached in spite of strong effort on the part of the Colt management to persuade him to remain there. The firm of Pratt & Whitney had its beginning in 1850, in a little device known as a spooler, used in textile manufacturing. Messrs. Pratt & Whitney were in its

manufacture the opportunity to make some money, and they formed a partnership and established a small shop in an old saw factory. The sewers contained their duties of the Phoenix Works. In the beginning two men were employed and the number had increased to 12 when their shop was destroyed by fire. A year was taken in to other buildings, and soon that entire structure was occupied. Before the end of the Civil War 100 men were employed. Mr. Pratt had invented a millstone machine, which became an important product and of which since that time the sales have run in the thousands. Mr. Pratt had been taken in as a partner to run the shop, but it became necessary for the founders of the business to devote their own time to its conduct, and in 1857 they left the Phoenix Iron Works. The first building of the present great plant was erected in 1862. Both industry and Mr. P. Whitney were taken into the firm. The business continued to increase rapidly, and its progress of that period, 30 years ago, has continued up to the present time. In 1880 the Pratt & Whitney Company was organized and incorporated with a capital stock of \$250,000. Capital and the business have grown together. Mr. Whitney was vice-president of the company and superintendent of the works, and in 1888 was made its president. Under the alliance with the Nitro-Ballast-Powder Company he is a director of the Pratt & Whitney Company. He has other manufacturing and general business associations, as secretary and treasurer of the Whitney Mfg. Company, of which his only son, Clarence D. Whitney, is the president; as director of the Pratt & Carter Company and as the Hartford Patent Company and as president of the City Telephone Pay Station Company.



AMOS WHITNEY.

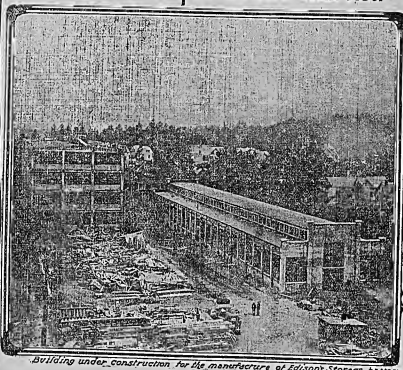
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JOHN T. HUTCHINSON
Correspondent and our correspondent.
Albion *See* 1897

Edison about to Give to the World His Greatest Wonder

The New Storage Battery, which is to Revolutionize Industry and Transportation, will soon be put on the market.



Building under construction for the manufacture of Edison Storage Battery

THOMAS A. EDISON has accomplished a surprise for the world. He has worked out successfully the problem of cheap power. He promises to put on the market within six months a new storage battery which will enable every man to travel in his own private car upon all the best of our cars.

"Without danger, without break-down, without almost a cent, energy, even supplied with the power, for \$200, will travel without ceasing for ten years, for a hundred thousand miles, if necessary, says the inventor. His invention is the declaration of the problem of cheap power in the big cities of the world. It is reaching two large factories, power nearly complete, and is installing in them new machinery especially for the manufacture of a motor battery that will be as common as kerosene in the home life of the world in the next few years."

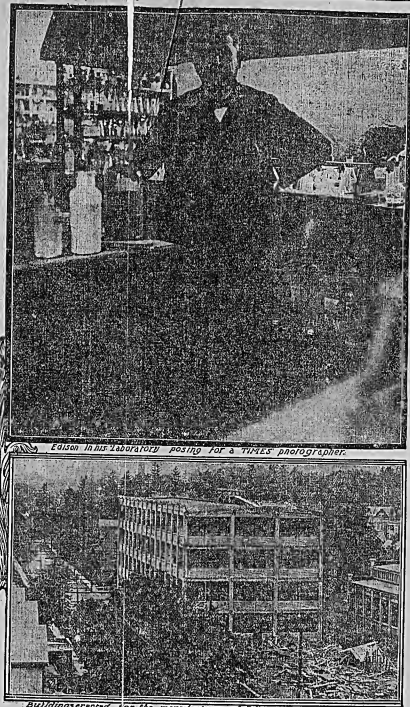
"Some time longer. So it has necessarily been slow work." A very promising battery would have been right last thing, and then something would go wrong. The public doesn't understand those things, and they get impatient, so if it uses only a matter of experiment, and it could hurry it.

"Well, indeed, not failed, other things failed, everything the ingenious Edison could, with his trained scientific mind, conceive, failed."

"Then I tried cobalt," he said, and punctuated the statement with a broad smile.

"And it worked?"

"It certainly did, but cobalt being one of the rare metals, the problem was not solved. I secured this country in that cobalt is sufficient quantities to warrant its use, and discovered how it is in Canada."



Buildings erected for the manufacture of Edison Storage Battery

also, in Wisconsin, in Oregon, in Kentucky. Then I knew that it was all right."

"H. E. I."

"What are you working up now in connection with the phone of the discovery?"

"One of the most difficult, problem is metallic."

"To separate cobalt from iron, men wish to be successful. At present it is done only as a great expense, and so, for the last, no more we have been doing a pair of getting cobalt out of the earth."

cheaply, within a ratio of cost almost calculated for the price of each cell."

"And you have succeeded?"

"Completely. I can positively promise that the new battery will be on the market in the Spring. The factory buildings are ready and the machinery is being installed."

"And then you are most surprised that Nature is holding back, that will interfere?"

"Absolutely none. I haven't lost 25,000 batteries for three years without discounting all chances of failure."

"Edison's assurance is not lightly given. He told how he had never before been unable, in spite of what the newspapers had said, and how at the present time it was absolutely accomplished. Edison is too old a scientist to make haphazard suppositions. Even while he was talking with Nature, none wins he had done, his mind was on measures of the unknown."

"When the electric light was first introduced, the wire was hidden in the pipes and had underneath," mysterious was of explanation of the device and unexpected. To every country in the world there had been efficient energy in Italy, where some peculiar quality of the soil literally set up an up to the wire."

"Unexpected surprise of this sort have delayed Edison's storage battery, and kept him working with steady purpose at it for four years and a half, but all that in a small matter in the face of the probability that at another year the storacious battery will be the only stored motive power."

"In fifteen years from now the horse will be a curiosity; we shall be paying 50 cents to look at him in a side alley," said Edison last night.

"Much of the success of the new storage battery will depend upon the ability of the rubber tire manufacturers to reduce the cost and increase the durability of their product. Mr. Edison was pleasantly surprised about this feature of the motor, but he is not too sure."

"If the manufacturers can only induce Mr. Edison to look into the phase of the coming evolution of the tire, the thing will be done, but the wheel is not as simple as it seems. He has said that there might be some unforeseen material as suitable as rubber for wheels, but just as he was sure that there was for some reason of the kind, but he is not sure."

"In Edison's world of magic there is no such thing as fail. When we consider the manner in which he has found failure, again and again, in connection with every one of his big inventions, the possibility of his coming point a point to ambitious dreamers."

"One of the things I do, Edison has been himself no more with that. Within the borders of the Edison works at Orange, N. J., two new factory buildings have just been added to meet the needs of the telephone department, but there were not of my interest in him. His mind is on the future, were on the buildings where the storage battery was to be built."

"The actual cost of recharging the new battery is a matter of five per cent, the greatest achievement being in making a motor power of light weight. It costs less than oil, and is more durable. Speed is not the purpose, but Edison has in mind."

"I am a commercial inventor, strictly commercial," he said.

"The scientific endeavor but popular phonograph has shown that, in fact, nearly everything Edison has ever done about it. For some time, to Edison's mind, was an operative storage battery that would be within the reach of every business man, especially the little man, than to construct a dynamo motor that will not and does. Thirty miles an hour is fast enough for any ordinary purpose, and if speed be desired, there are the fires on the railroad."

"The new storage battery is not designed to be of any use to the automobile. A friend of Mr. Edison's tried a few cells on a ten-horse machine, a white one, and found that as active power it was reasonable, although not as good as the position in speed. It is not an automobile manufacturer, and I should say of saving the problem of street traffic, which is almost in all the great cities of the world," says Edison.

"The storage battery, depending, as it does, on the horse, means that the congestion of street traffic will be reduced somewhat. It shows within the reach of almost every one a private convenience. Its effect upon the street situation compares very favorably with the automobile. The storage battery is the only one that will be cheaper to buy twenty miles an hour, than the street trolley, and it will be able to pay for itself. Their limited speed capacity about the city (in fact, it will be able to pay for itself, and, as to the motor and primary that will store—there is no limit to the power of the battery, and the city traffic the public will prefer."

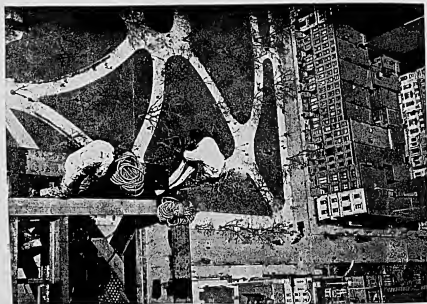
"Absolutely none. I haven't lost 25,000 batteries for three years without discounting all chances of failure."

Drawn by
H. E. I.

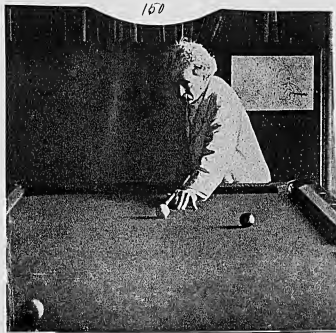
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FROM A PHOTOGRAPH, COPYRIGHT, 1901, BY UNDERWOOD & UNDERWOOD
October 1907
 "LION TRAIN"



*From
 Madame Square
 from the "Mistral"
 New York
 1908*



G. CLEM
 here F





Alfred "In military uniform with a 'det-lighted' smile." *Sept 1907*
Secretary Lock, the President, and Major Fletcher at Yellowstone Park.



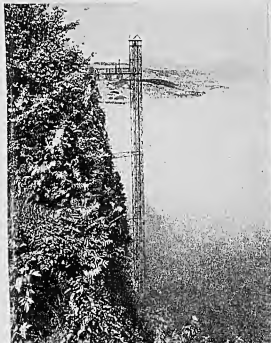
FROM STEGOGRAPI, COPYRIGHT, 1907, BY UNDERWOOD & UNDERWOOD
BEAR-ADMIRAL EVANS
Outlook Nov 1907.



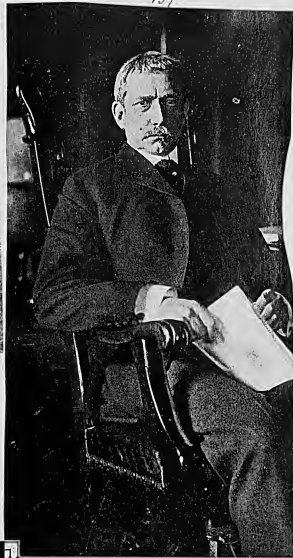
'Delivering himself of his favorite "personal appeal."'
Appleton Sep 1907



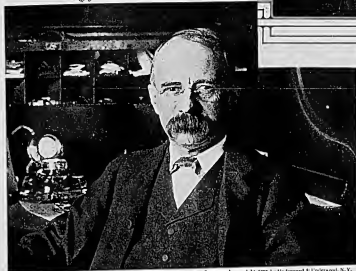
"You of the Blue!"
 Appleton Sep 1907



The Lift Leading to the Highest Point of the
Burgenstock, Overlooking Lake Lucerne.



ELIMU ROOT,
Secretary of State.



Edward H. Harriman, Railroad Emperor, in His Private Office, 126 Broadway, N. Y.

110 from
H. P. Lums
Sept 15
1908

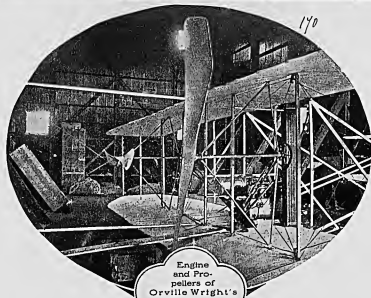


Photo by
Clarendon

172
taken by
H. P. Lums

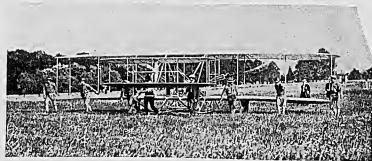
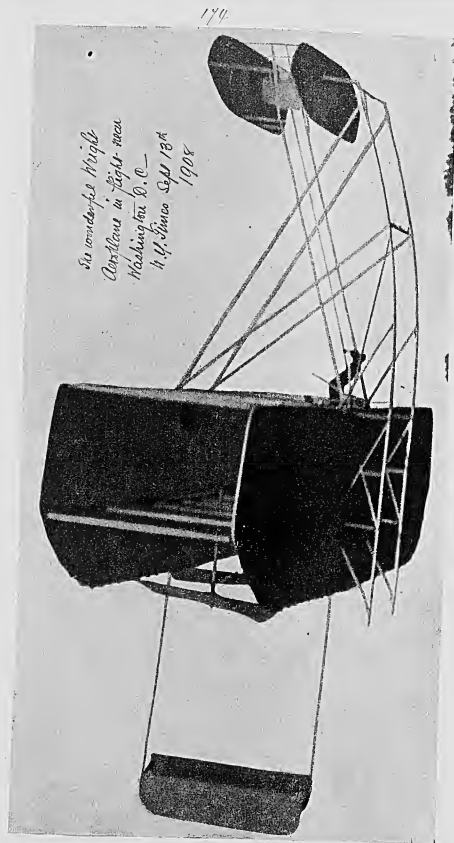
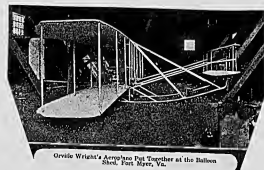
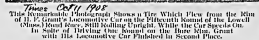


Photo by
Clarendon

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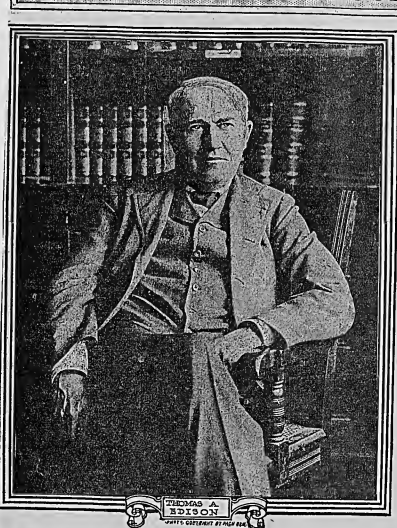




Times Oct 11 1908
This remarkable Photograph Shows a Tire Which Flew from the Rim of J. F. Grant's Locomotive Car on the Pilecuth Road of the Lowell (Mass.) Road Since, Still Rolling Upright, While the Car Speeds On.
In Act of Driving this Road on the Bare Rim, Grant with His Locomotive Car Finished in Second Place.



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Zipfel Flying at Tempelhof.



**"Everything,
Storehouse
Supplanted**

"Everything, anything, is possible. There is a great distinction between the scientific experiment that is planned and the practical adaptation of it to life. We read of wonderful things, but whether they are possible or not is another matter."

"Oh, yes, undoubtedly we can come. It won't be the aeroride won't be the dirigible balloon. It may suffice to make a very experiment, but it is not what I believe that is the solution of the problem. It seems out of a universal law, not, upon the skill of one man."

"The aeroplane is a romerik. It comes as a theory, controlled that theory, and is not yet adjusted. But I firmly believe that some day it will be able to fly, it's only a matter of time. It's only a matter of engine with sufficient power. It is so much to do, though, such a long way to go, in the form of a dream."

"What is the immediate future?"

"Power that will be generated. It's not new. A lot of them are been working at it for some time. Electricity in any requirement of it have to burn coal, make steam,

The next step is to generate electricity from coal itself. Coal is a carbon, and the sun's heat, and carbon is the fuel we know of. I haven't done it yet, but I will. The power is there; we know that electricity can be generated from coal because it has been done as a by-product, but not to an extent sufficient to make a discovery. The first indications that appear in experiment are that Man is slow to understand, his mind is not enough to gather all the men's secrets."

It is doubtful, perhaps, just what new forms of human energy will come to us with our eggs and bacon every morning, but we do know that having said as a regular item in the daily routine of events. There is a general, quite vivid, impetus of this fact, as Mr. Thomas A. Edison says, after seeing, the future.

Life has come to have a commercial aspect of the matter that has hidden in the obstinacies of nature. Canned opera and moving pictures have their prospect for improvement, the storage battery is being manufactured to the ultimate solution of economy in traffic, the automobile is being improved, and wonder, and Edison dismisses them with a wave of the hand, as a conjurer amiably bows himself off the stage, in amiable acknowledgment of his trade.

"We ought to be the trouble; but we have to creep through the world as the best," he says.

sensitive relation between all phases of scientific discovery is the striking feature of modern experiments. These are thoughts that, as an index, point to the foresight of Edison's present activity. "I don't know," he says. "In his laboratory there is no self-indulgent retirement. He is always busy," he says, after three score years of eager industry to catch the secret whisperings of natural phenomena, a busier man than he ever was before.

"Everything, Anything, Is Possible."

"We knew nothing; we have to creep by the light of experience, not by the light of the day or the hour that we shall find it, we are young," he says.

Mr. Edison looks, as he always did, after his years, for his time.

He seems to have reached an Autumn that does not change yesterday; an Autumn that vouches the ceaseless energy of his life.

"Now that I've retired from the commercial as-

The Uncertainty in Invention.
To the average mind there is the imprisonment of a circuitous perception. We identify with our senses everything—but mystery. A corporate uncertainty still perplexes the inspired makers of invention. A

THE FUTURE'S POSSIBILITIES OUTLINED BY EDISON

"Everything, Anything, Is Possible," He Declares; "The World Is a Vast Storehouse of Undiscovered Energy"---A Future in Which Steam Will Be Supplanted by Electricity---New Motive Power May Be Discovered.

coverks are coming so thick and fast, there are so many of us working like beaver; at them, that it is appalling merely to think about possibilities in the future."

"Everything, anything, is possible; the world is a vast storehouse of undiscovered energy."
 "There is a great distinction, however, between the scientific experiment that accomplishes its end and the practical adaptation of it to humanity at large. We read of wonderful things being done experimentally, but whether they can be accomplished practically is another matter."

"Oh, yes, undoubtedly we shall; it's bound to come. It won't be the aeroplane, however, and it won't be the dirigible balloon. An individual theory may suffice to unmake a very interesting scientific experiment, but it is not what one man himself believes, that is the solution of a problem that must come out of a universal law, of nature, dependent upon the skill of one man with one machine, but of a machine for all men."

"The aeroplane is a remarkable experiment, but it comes as a theory, controlled by the man who has that theory, and is not yet adjusted to universal use. But I firmly believe that some day we shall know how to fly; it's only a matter of engine with sufficient power. It is so much to do, though, such a going on in the form of scientific promises now wender, new sense of life and time and money."

"What is the immediate motive power of the future?"

"Power that will be generated without steam. It's not new. A lot of them are now working at it; have electricity in any requirement of great power now we have to burn coal, make steam to run the dynamo. Electricity direct from coal itself. Coal is a carbon, the accumulation of the sun's heat, and carbon is the best combustible."

we know of. I haven't done it; I hope somebody will. The power is there unquestionably. We know that electricity can be generated directly from cool because it has been done as a scientific experiment, but not to an extent sufficient to call it a practical discovery. The first indications of a secret in nature that appear in experiment are always very feeble. Man is slow to understand, his five senses are not enough to gather all the meaning of experimental science."

Electrical Energy in Coal.

"There is a direct electrical energy in coal?"

"Of course there is. One of the difficulties we have to overcome in obtaining electricity at first hand from coal is the ashes—; it is there. We get it from zinc, iron; why not from carbon? So far, however, we have only accomplished it in a scientific experiment. I haven't done it yet, I may, anyhow; I hope some one will."

Edison has joined the cloistered life of science, he seeks an impersonal and universal knowledge.

"Do you think the railroads will eventually disappear with steam entirely in favor of electricity?"

"Well, what we need most to perfect, to improve, to make more efficient is a new generation of men getting old, slow, and inefficient."

The wizard smiled grimly and said:

"I have no doubt that the new generation of men will eventually displace the old."

not a railroad are old-fashioned? Women who run them are may be an exception, more than the one I can think of just now (tion of the Great Northern Rolling water power now. But, of course like Hill. It was just the same

electrical power was proposed for the elevated roads in New York. Remember how Jay Gould and Russell Sage delayed and blocked the installation of electricity? And then, thank how glad they were when it was installed and they found out how well it worked! There is always a technical investigation of a new idea in science that is reliable and can be trusted."

No, Mr. Edison wouldn't be quoted, but there

was one Eastern railroad that adopted an impossible system of electrification, and another one that was using the correct and only system of electrical railroading. The one that was having trouble should have regarded the technical opinions against it. The other one was running smoothly, easily. But these were merely questions for the men who run the railroads. The inventors had worked it all out for them anyway.

"A new generation of railroad men will adopt

"Why not? We haven't half demonstrated the forces of water power yet as a universal energy in engineering. The Pacific Railroad is using it somewhat, to be sure—but well—" That was all up to that new generation.

"Can the tides be utilized to run dynamos to any important purpose?"

"No, the energy of the tides is not great enough to generate sufficient motive power. I don't believe

"Will the sun's rays be harnessed to do the work of machine powers?"

Harnessing the Rays of the Sun.

"As a scientific experiment that's already been done. In fact, in a small way, there is a practical demonstration of it I believe in the West. In Arizona I saw a thirty horse power motor run by the rays of the sun, by reflecting the sun's rays in mirrors

"Oh! but we don't know! Quite probably there is a mother power in the light of the sun as it reaches the earth that may be utilized some day. The indications of scientific discovery are so amazing and the co-relation of all its various forms of progress are so intimate that we just begin to find out how feeble we really are to cope with them. Look at bacteriology, what wonderful advancement there is in it."

This was a new interest that the Edison factories had not considered, but it was an indication, a chance suggestion of the increasing scope of Mr. Edison's sweep of scientific activity.

One of the gentlemen who presides over the commercial destinies of the Edison factory in West Orange, N. J., described Mr. Edison as an "optimist who was inclined to elaborate the scope of his inventions." So much is due to this "optimism," however, that it would seem to be a special respon-

"I've been five years and a half trying to get my storage battery perfected; that was a long pull; it came hard, but it has come. They're making them out there as fast as they can," said Edison, waving a hand in the direction of the storage-battery building. There was no optimism about this. The storage battery had lost its interest since it had become commercial.

"The result of it all will be an electrical taxicab."

"We have been giving the thing a final and severe test," he continued,

"We've driven an electrical trolley over 5,000 miles at a speed of fifteen miles an hour over the

worst roads, hills, and ruts we could find in and around Montclair and Newark. The result was entirely satisfactory so far as the storage batteries were concerned, but the test now is to get a vehicle that will conform to the efficiency of the batteries. I am told that by January next an electrical taxicab will be seen in New York."

"The storage battery is literally ready?"

"Yes, that's done. You see, after testing them for a certain length of time they began to run down. Then I recalled them and began to stink on the problem again. It was found, however, that those in use did not run down any further, as we expected but retained a fixed degree of energy, somewhat less than we had at first estimated," said Mr. Edison.

"The effect of these bottles upon street traffic has already been widely explained."

No Artificial Black Diamonds as Yet.

"Nothing new in the phonograph?"

"Improvement, considerable improvement, I think. Instead of the two-minute record we used to have we now have a four-minute record, which means that we can reproduce musical compositions with more deftness and accuracy than could be done before."

This has been acquired by doubling the number of threads on a record from 100 to 200. This required new machinery, a new material out of which to make the record and an entirely different style from the old one in use before.

It had been announced that Edison was perfecting the discovery of a way to make black diamonds—treasures that are very scarce and expensive, but are used chiefly for drilling in the mining of precious metals.

"I have not discovered a way to mine, artificially, the black diamond, but I am working on it, among other things that interest me. The discovery, if made, is not one that the general public can fully appreciate, but its importance to the mining world is very great. At present the black diamond is used for drilling, but it is very rare and very expensive. The advantage of an artificial black diamond would render millions of dollars' worth of precious metals lying undiscovered in the earth to-day accessible."

"Experiments indicate that the black diamond can be made artificially?"

"There is an indication, but while a practical theory is a good lead, it is not a sure thing; but there is probably 85 per cent. of the earth's hidden treasure untouched because of the lack of facilities to drill them out of the rock to the surface. That is

"There is an attempt being made now to gather the nitrogen of the air and use it for fertilizing purposes of the earth," he said, and, jumping out of his seat, he pointed to the sky.

"Oh, in a few billion years that a billion years who can't do account Mr. Edison is conservative;) sensational vagaries of fanciful numbers.

"Put it all down as it is,
and it was "

sensitive co-relation between all phases of scientific discovery is the striking feature of modern experiments. These are thoughts that, as an individual, I find it difficult to grasp. I find it difficult to grasp the foresight of Edison's present activities. I find it difficult to grasp the foresight of Edison's present activities. I find it difficult to grasp the foresight of Edison's present activities.

He seems to have reached an Autumn that does not chafe, outwardly, an Autumn that wells up

"Now that I've retired from the commercial aspect of my work in the laboratory, I suppose I should really work harder than I ever did in my life," said.

"I've always got more than one thing in mind for development, twenty things that I, hope to do, that I hope some one else will do. Scientific &

IT is doubtful, perhaps, just what new form of human energy will come to us with our eggs and broods every morning, but we can be sure of having it as a regular item in the daily procession of events. There is a general, quite vivid impression of this fact, as Mr. Thomas A. Edison states, or rather senses, the future.

ne more than the new modes in the obstinacies of nature. Canned opera and moving pictures have their prospects for improvement, the maraga battery being manufactured to the ultimate solution of economy in traffic, the phonograph is now but a child's wonder, and Edison dismisses them with a wave of the hand, as a conjurer smilingly bows himself off the stage, in amiable acknowledgment of his trade.

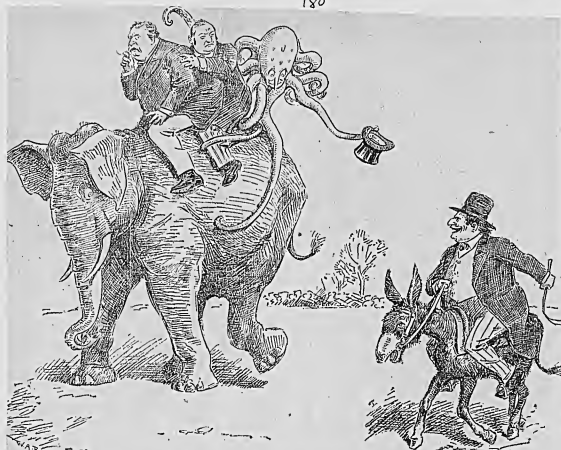
"We only have five senses, that is the trouble; we have to creep through the world at the best," he says.

The Uncertainty in Invention.

To the average mind there is the imprisonment of a circuitous perception. We identify with our senses everything—but mystery. A desperate uncertainty still perplexes the inspired makers of invention. A

W Carnegie and
Mary Garden.
The liner Adriatic, on its recent
arrival at New York. (N.Y. 8/1908
Photo by Brown Bros., N. Y.)
178
lying at Tempelhof.

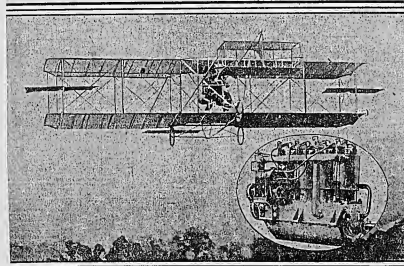
for a series of exhibitions in aeroplanes in Berlin during Summer. The flights over the famous Tempelhof airfield, on the outskirts of the city, were held where the trials of the aeroplane by Armand Zipser, held under the Lokomotiv banner.



Customs after D. K. Schaeffer declared he was going to vote for Taft. N.Y. Herald Tribune
THE ELEPHANT IS TICKLED, BUT NOT TICKLED TO DEATH.

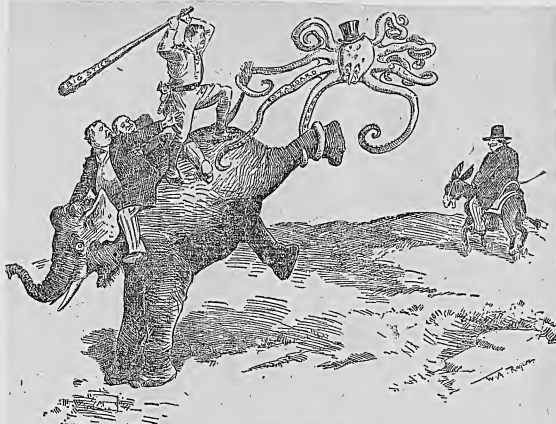
The Latest Creation of Glenn H. Curtiss.

Nov. 19, 1909



Aeronautical Society's New Aeroplan equipped with a 4-Cylinder 25-Horsepower, Water-Cooled Motor.

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UNAPPRECIATED.



LEWIS
INDICEN

Dec 1908

FOR SAILING THE SEAS.

In Fuel, Type of Vessel, and Power Many Things Are Needed.

BY LEWIS INDICEN.

INVENTIONS in connection with sea-
sailing vessels come just as unex-
pectedly as on land.

Of course no one expects any revolu-
tion in types of vessels or methods of
propulsion, as great vessels cost too
much to permit other than the most
conservative experiments.

The production of steam has so far
as economy in fuel consumption is con-
cerned, reached nearly its limit.

But the very fact of the gradual us-
ing up of coal and that the cost of fuel
will increase may lead to a more exten-
sive use of the sailing ship, as winds
will continue to blow and their energy
cannot be cornered.

But the sailing ship of the future will, I feel sure, be
an auxiliary—that is, have power to
drive her in calm and against head
winds.

The engine for this purpose
will almost certainly be the gas engine.
The most important step in marine pro-
pulsion will be to follow the great suc-
cess of the gas engine on land and ap-
ply it to the propulsion of vessels.

This will save in fuel and upon occupied
space more room for cargo, and greatly
reduce the strain on the machinery
operation.

With the increase in size will come
more efficient means for handling
fuel.

It may be that screw propellers will
be greatly bettered, and that
propellers better fitted to fast
revolutions may be developed. In this
there is opportunity for radical change.

Of course, with the improvement in
making steel and other alloys the sea-

vingness is gained from the use of
several sections of less weight will
result in a uniform advance, but this is
always a gain.

Before many years we shall see the
absolutely fireproof steamer for carry-
ing passengers.

But it will be with the war vessel that
progress will be most noticeable.

Heavier guns, heavier steel, more effi-
cient powder, greater perfection in
shooting and firing are the result of
present development. I expect soon to
see the heavy armor, coming towers,
and smokeless discharge. They are
all available, and the future battleship
will not have them.

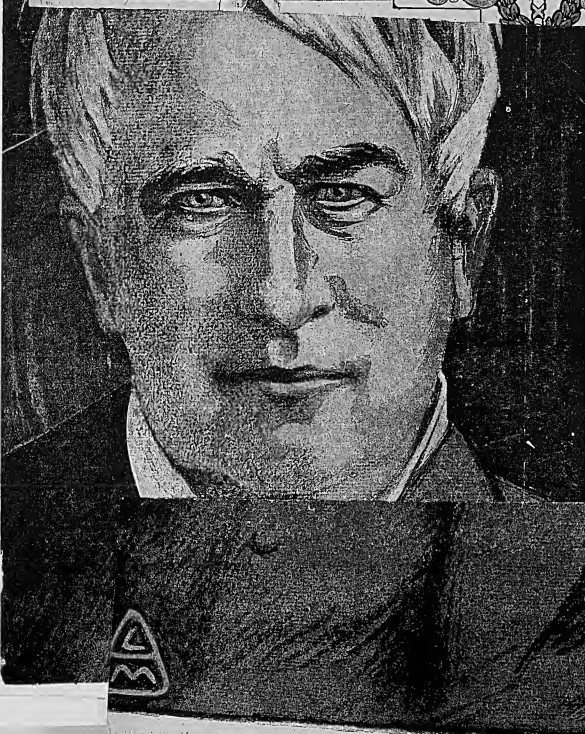
In 1902 I pointed out that it would
some day be possible to protect abso-
lute invulnerability with the possible result
of shooting to death the men on an
enemy's ship or at least of reducing
them helplessly.

I do not share prophesy far to the fu-
ture. All that I have said above are
events in the making.

183

WHO ARE THE TEN GREATEST LIVING AMERICANS?

(EXCLUDING POLITICIANS)



THOMAS A. EDISON.

Drawn by Leo Mielziner.

"Great men are not always wise."—OLD TESTAMENT (JOB).

"No man can produce great things who is not thoroughly sincere in dealing with himself."—LOWELL.

"He is truly great that is little in himself and that maketh no account of any height of honors."—THOMAS A. KEMPIS.

"Greatness of mind is not shown by admitting small things, but by making small things great under its influence. He who can take no interest in what is small will take false interest in what is great."—RUSKIN.

"Great men are the true men, the men in whom nature has succeeded. They are not extraordinary; they are in the true order. It is the other species of men who are not what they ought to be."—AMIEL.

"He fought a thousand glorious wars, And more than half the world was his, And somewhere, now, in yonder stars, Can tell, mayhap, what greatness is."—THACKERAY.

"That man is great, and he alone, Who serves a greatness not his own, For neither praise nor policy Content to know and be unknown, Whole in himself."

—(and Lytton)

1. The question is: When honor is at the stake."—SHAKESPEARE.

2. In deciding this question the SUNDAY HERALD will be guided by the opinions of its readers. Pictures of the ten men receiving the largest number of votes will be published during successive weeks.

3. The SUNDAY HERALD asks you to send not only a list of men, but also your reasons for thinking these men great.

4. Give your reasons clearly in not more than a hundred words. The best opinions received will be published, with or without the writer's name, according to request.

5. Address all communications—The Sunday Editor, New York Herald.

"There is no great genius without a mixture of madness."—SENECA.

"Nothing is more simple than greatness; indeed, to be simple is to be great."—EMERSON.

"Genius," which means the transcendental capacity of taking trouble, first of all."—CARLYLE.

"Great men are they who see that the spiritual is stronger than any material force, that thoughts rule the world."—EMERSON.

"Great souls are always loyally submissive, reverent to what is above them, only small mean souls are otherwise."—CARLYLE.

"He alone is worthy of the appellation who either does great things, or teaches how they may be done, or describes them with a suitable majesty when they have been done; but those only are great things which tend to render life more happy, which increase the innocent enjoyments and comforts of existence, or which pave the way to a state of future bliss more permanent and more pure."—MILTON.

"No great deed is done. By fathers who ask for certainty."—GEORGE ELIOT.

"Rightly to be great Is not to stir without great argument, But greatly to find honor in a straw, When honor's at the stake."

ARE EX-THIS N.

ant feure in the

A CHARACTER STUDY IN COLOR BY LEO MIELZNER, THE SECOND IN THIS SERIES, WILL BE PUBLISHED IN THE SUNDAY HERALD OF NEXT WEEK.

WHAT ARE THE QUALITIES OF GREAT MEN?

"Genius is mainly an affair of energy."
—MATTHEW ARNOLD.

"There is no great genius without a mixture
of madness."—SENECA.

"Nothing is more simple than greatness; in-
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—GEORGE ELIOT.

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But grately to find honor in a straw,
When honor's at the stake."
—SHAKESPEARE.



WHY POLITICIANS ARE EX- CLUDED FROM THIS DISCUSSION.

"The politician is a constant figure in the
city

linelight of public attention, ...
draws to himself a large share of glory that fre-
quently dies away when he retires from office.
Thus, there may be differences of opinion as to
the permanent greatness of Theodore Roosevelt,
William H. Taft, William Jennings Bryan and
others whom our readers would be likely to con-
sider among the ten greatest living Americans.

We therefore ask our readers to include in
this discussion only men who may be great in
other lines than politics, such as invention, phil-
anthropy, education, literature—in short, any of
the arts or sciences.

This week we present a forceful character
study by Leo Miedtner, the portrait painter, re-
cently returned from Paris, of a man whom, we
are sure, all our readers will select as one of the
ten greatest living Americans, THOMAS ALVA
EDISON. His inventions and discoveries have
been of incalculable value to civilization, and his
fame has justly spread over all the world.

Edison is unquestionably one of the ten great-
est living Americans.
Who are the other nine?

10

FINDS RADIO-THOR AS GOOD AS RADIUM

New Substance, Declared to be
Cheap and Efficient in Many
Diseases, Shown to Doctors.
MADE FROM PITCHBLEND

Dr. Bailey Exhibits Its Uses and a Dyn
Derived from Its-He Heavily In-
jured by His Experiments.

CHICAGO, Feb. 24.—(By P. H. Hild-
year of Northwestern Medical College is-
sued further details of the discovery of
"radiothor," which was made public
at New Orleans yesterday by Dr. H. S.
Talley, also of Northwestern Medical Col-
lege. Dr. Hildyear was connected with
Dr. Bailey in making experiments.

One of our most serious experiments
with it was made by Dr. Hildyear, who
was the victim of a pneumonia
through a severe cold, and then
died. He made a series of experiments
with it, and the results were as follows:
It was found that it was a powerful
antiseptic, and that it was also a
powerful stimulant. It was found that
it was also a powerful sedative, and
that it was also a powerful anesthetic.

Dr. Bailey made the substance in a
pitchblende, and it was found that
it was a powerful antiseptic, and
that it was also a powerful stimulant.

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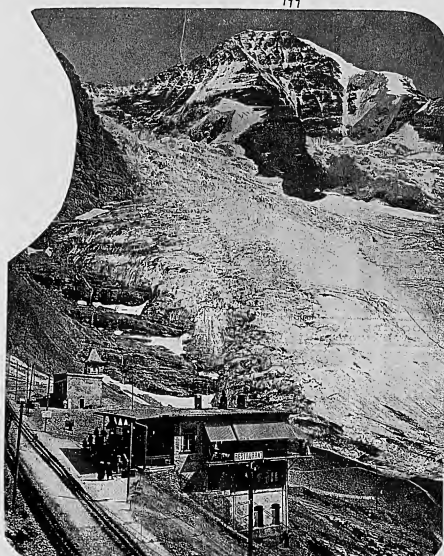
A Station in the Heart of the
Massachusetts.



Descending Cut
in the Rock in Glen View
of Chicago.



View
From Near
the Eigerwand
Station.



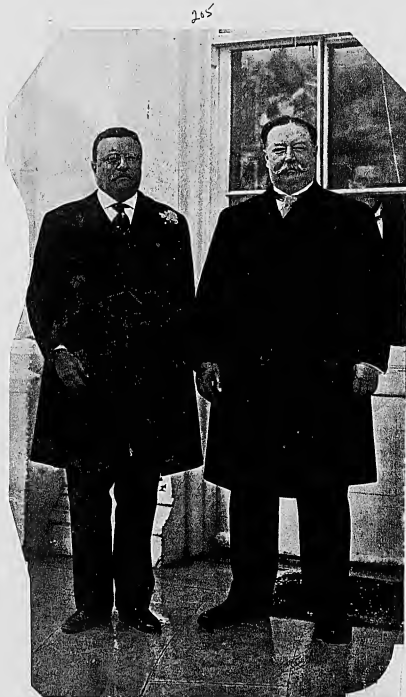
Station at Eigerwand.
(Photo Paul Thompson.)



View of the Grindelwald Valley from Rigi
Eigerwand Station. (Photo Paul Thompson.)



Observation Platform at the
Eigerwand Station.



FRITZ AND ROOSEVELT IN FRONT OF WHITE HOUSE
 Taken April 1904, Just Before Leaving for the Capitol.
 (Photo, Copyright 1904, by J. Fritz & Co., New York)

John Fritz Medal Presented to Charles T. Porter.

For his work in advancing the knowledge of steam engineering and for improvements in engine construction, Charles T. Porter, honorary member of the American Society of Mechanical Engineers, was awarded the John Fritz Medal by the committee representing the four national engineering societies. The presentation took place on April 15, in the Engineering Societies Building, New York City. Henry B. Towne presided and addresses were made by David W. F. M. Goss, University of Illinois; Prof. P. H. Haffner, Columbia University; Robert W. Hunt, Chicago, and Frank J. Sprague, New York.

David Goss spoke of the altered conditions that came with the steam engine. The mine of England were freed of water, because industries received, new systems of sanitation introduced, new water and effective transmission, some vastly improved lighting, power and transportation. Steamships and locomotives have been the means of extending civilization. Following this address, Mr. Porter was introduced by Jesse M. Smith, president of the American Society of Mechanical Engineers.

CHARLES T. PORTER

next, and E. G. Spillbury, chairman of the Awarding Committee, presented the medal and its accompanying certificate. A number of congratulatory letters and telegrams from John Fritz, the Iron & Steel Institute, Institution of Mechanical Engineers of Great Britain and others were then read.

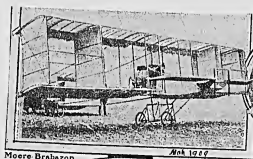
Professor Haffner indicated as the most important work of Mr. Porter the introduction of higher speeds, with the solution of the problems involved, elevating the standard of mechanical construction and perfecting suitable condensers and governors. The address closed with a tribute to two of Mr. Porter's early associates, Prof. C. H. Vianster and John W. Allen.

Mr. Hunt declared that iron and steel engineering are a great field to Mr. Porter. The remarkable development of the steel industry since the birth of the Bessemer process was made possible practically by the application of a more rapid power. Among the first to attach the rolling mill engine direct to the train of rolls were John and George Fritz, but the speed of the steel industry was limited. Mr. Porter was the first to give the mill engine a controllable direct coupled, compound high speed engine. Mr. Hunt constructed two engines in the mid. Albany & Newburgh rolling mill plant in Troy, N. Y., in 1878. One set of rolls was driven by a walking beam low pressure engine, taken from the steamboat Swanlow, running at about 25 rev. per min., and the other set by Porter-Aiken high speed engine.

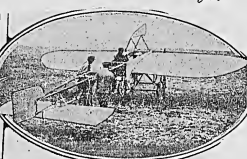
Mr. Sprague recalled the French Exposition in 1887 where two Porter-Aiken engines were the only high speed ones exhibited, and drove electric generators. In 1890 Mr. Porter installed a high speed engine in Edison's laboratory at Menlo Park, and shortly after for the Port of New York station, New York, the first of a series of engines for so-called steam dynamos, each independently driven by a direct coupled engine. To Mr. Porter belongs the credit for first commercially demonstrating the high speed possibilities of the engine and opening the way for the present possibilities.



All these were shown in London in Nov. 1909 208



Moore Brathorn Diphane



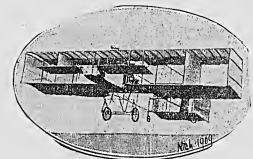
New Blériot Monoplane



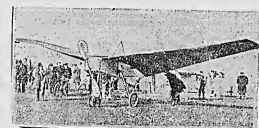
New Form of Helicopter



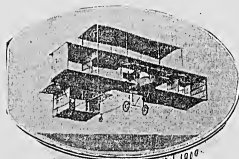
The Cernu Helicopter



Delagrangé Diphane



Gastambide Monoplane



New Farman Triplane



Melvin-Vaniman Triplane

209 EAST RIVER'S FOURTH SPAN

MANHATTAN BRIDGE BECOMES A REAL BRIDGE AT MOON.

Workmen Put Connecting Girders in Place and Then Drink "Pop" to Celebrate—Captains Blow Whistles at Sight of Flags—Engineers Pleased by Accurate Meeting.

Oct 7 1909
Just over two miles of the East River's Manhattan derrick arm among a great view of steel this morning. From it derrick wound and emerged. The cables, till the big piece of steel sank neatly into a bay which was left for the better two miles of structural work between the old air from opposite sides of the river—the Manhattan Bridge, the derrick arm and the East River, became a fact.

Next moment, a workman's ribbon came for the sake of posterity, shall here be recorded as historical among others. Eight girders were put in place at once, each carrying a flag, four from the Manhattan end, and four from the Brooklyn side. There were public were put in place in response, more Wilson's, Johnson and the

LARGEST BRIDGE IS OPENED

MANHATTAN SPAN TO BROOKLYN HAS COST \$14,000,000.

Oct 1 1909
Greatest Carrying Capacity in the World, though the Part Over East River Itself Is Slightly Shorter than Two Other City Structures—Project Launched Ten Years Ago.

Now New's newest and greatest bridge, the Manhattan, was opened formally this afternoon, and at five o'clock the ticket machine will be ready to collect the first wagon tolls on the roadway.

Early in the administration of Mayor Van Wyck, who was also first Mayor after the consolidation of Greater New York, plans were considered by the Department of Bridges, under the direction of Commissioner John L. then, for a third bridge over the East River, between the boroughs of Manhattan and Brooklyn. In November, 1900, the first year of Van Wyck's Administration, a resolution was adopted by the Board of Public Improvements authorizing the commissioner, in consultation with the president of the Board of Public Improvements, to prepare plans, surveys, and estimates.

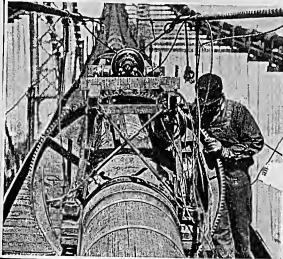
In December, 1900, the Board of Public Improvements adopted a resolution approving the plans and transmitting them to the Municipal Assembly. A resolution was adopted by the assembly on December 20, 1901, by the Board of Aldermen on the same day and approved by the Mayor, January 8, 1902, authorizing the construction of the bridge.

The first contract for construction was let in May, 1901, and it covered the pier in Brooklyn for one of the two main towers of the bridge. The contract for the construction of the other main pier, in Manhattan, was let in December, 1901. The contract for building the substructure in Brooklyn was let in January, 1902, and the contract for building the substructure in Manhattan was let in February, 1902. The contract for the construction of the towers, piers, approaches, and approaches, was awarded, was let in June, 1904 for the approaches in Manhattan and Brooklyn. In December, 1907, for the roadway pavement, footwalks, lighting, laying of tracks and electrical equipment for car lines on the lower deck, and the district work needed for lighting the bridge, in 1907.

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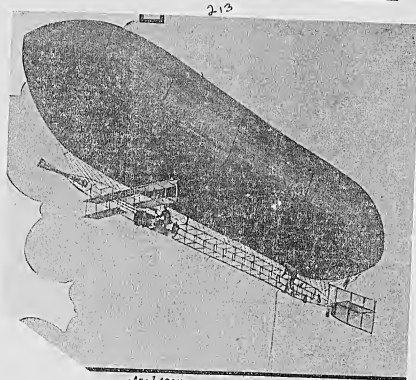
Note on cable to left the cables which carry the suspension cables. Below is seen the completed portion of the roadway.
Oct 10 1909
Manhattan bridge from the Brooklyn tower.



View on two of three cables the one which carries a span of wire. This wire is wrapped with the cable under the tension of an all-steel band.
Oct 10 1909
Wire-wrapping the 21 1/2 inch cables.



Oct 10 1909
Bulk of cables with suspenders in place.



April 1909 'Dirigible No. 1'—Signal Corps, U. S. A.

FRENCH MONOPLANE WHICH MADE A FLIGHT



Mr. Bleriot Under Way for a Flight



AT DOVER, AFTER BRE.
Mme. Bleriot, M. Bleriot, Count



A Bow View July 1909



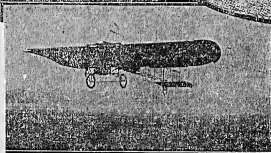
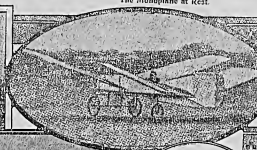
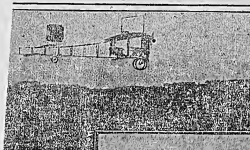
Descending July 1909



THE NEW YORK TIMES, MONDAY, JULY 26, 1909.

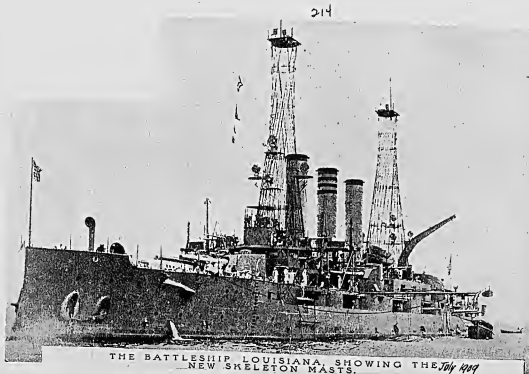
Airship That Crossed the Channel.

The Monoplane at Rest.



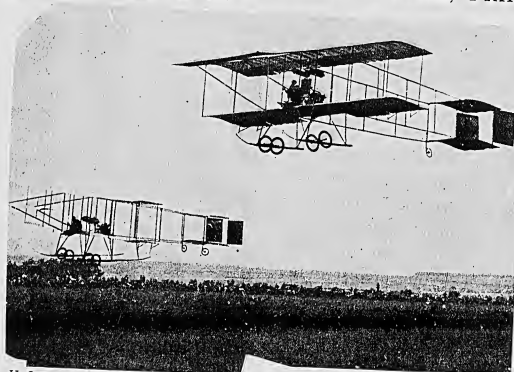
The Monoplane Leaving the Ground.

M. Bleriot.



THE BATTLESHIP LOUISIANA, SHOWING THE
NEW SKELETON MASTS.

RACES IN AEROPLANES NEAR RHEIMS, FRANCE



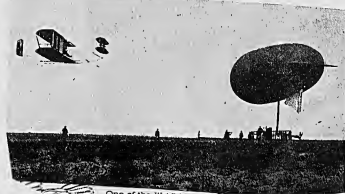
H. Somer (to the right) and Farman
acing.



A Race
Between two
Voisins,
Faulhan
Leading,
De Rue
Next



LISSANDIER LEADING.
FAULHAN NEXT.



One of the Wright
Machines passing
the Zeppelin
Airship.

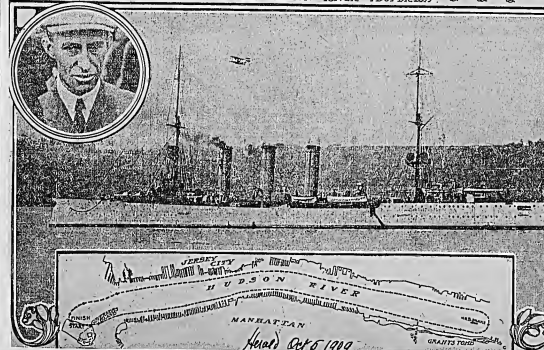


FARMAN TAKES UP TWO PASSENGERS
(Photo by Brown Bros.)



M. Bleriot's Fastest Monoplane Wrecker
and Burned at Rheims

WAS TAKEN UP BY A PHOTOGRAPH MADE AT MILLON AIRPORT EARLY FLYING OVER THE
WAS TAKEN UP BY A PHOTOGRAPH MADE AT MILLON AIRPORT EARLY FLYING OVER THE



LEON DELAGRANGE KILLED

FAMOUS FRENCH AVIATOR MET
DEATH DURING FLIGHT.

Fell with Monoplane at Aerodrome
at Bordeaux While Turning at
High Speed Against Wind — His
Notable Feats in Aviation—Had
Broken Speed Records. 1910

BORDEAUX, January 4.—Leon Delagrangé, the famous French aviator, was killed while making a flight here to-day. He fell with his machine from a height of about fifty-five feet, and was crushed under the weight of the wreckage.

He had been flying in a wind that was gusty, and which frequently blew at the rate of twenty miles an hour. In spite of this disadvantage he continued, and had circled the aerodrome three times when suddenly, as he was turning at high speed against the wind, the left wing of the monoplane broke and the other wing collapsed. The machine tumbled over and plunged in the ground. Delagrangé was caught under the weight of the motor, which crushed his skull. Death was instantaneous.

Leon Delagrangé ranked among the first of the aviators of the world. On December 20 last at Jersey, he broke all speed records. The question was as to whom was the Michelin Cup. He did not succeed in beating Henry Farman's record for the day, but did establish a new distance record for monoplane, and a new speed record for 25 minutes, maintaining an average speed of approximately forty-five miles an hour.

Delagrangé had been well-known as an automobilist, and was one of the first men in Europe to take up aviation. His feats soon attracted wide attention, and he was said to have been offered a guarantee of \$10,000 if he would visit the United States.

In last October Delagrangé made a flight record for one mile and 800 yards of 1 minute and 23 seconds.

His first public flight was made March 11, 1907, at Le Mans, France, when he ascended in the air and descended, some days later Delagrangé made a flight of 400 feet, carrying a passenger. He continued experiments with a biplane, and, visiting London in 1908, made a flight in the presence of royalty. Soon afterwards at Turin he lost a woman passenger on a brief trip. On September 6, 1908, he lost the same flight time record by travelling 10.5 miles in 23 minutes and 22 seconds. In May, 1909 at Jersey, he won the Lagardère prize, making 24.6 miles in 21 minutes and 22 seconds.

He entered the automobile at Rheims in August last, appearing for the first time in a monoplane. He captured the tenth prize for speed and the eighth prize for distance. In September last he visited Denmark and made a flight of fifteen minutes before King Frederick at Aarhus.

Delagrangé's first really sensational flight and the one that made him a contender for all prizes, was the one accomplished at Pau on October 24, 1909. At that time he flew six miles in 7 minutes 24 seconds at a rate of about fifty miles an hour.

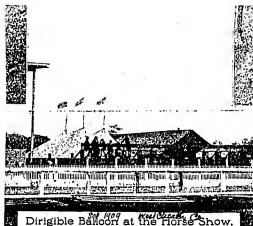
Delagrangé has exhibited great daring, and at times did not hesitate to take grave risks rather than to disappoint crowds that gathered to see him. On November 6, 1907, he fell with his aerodrome while giving an exhibition at Bay. The machine was smashed, but the aviator escaped with a few cuts and bruises.

It was also at Bay that Delagrangé narrowly escaped crushing a crowd of spectators who had taken possession of one end of the field during his exhibition. This accident happened in May, 1908. Delagrangé was travelling at a high speed close to the ground when his machine veered towards the crowd. He promptly alighted at the power, and he descending without any automobile.

During the exhibition week at Rheims the propeller of Delagrangé's machine broke from its shaft and the aerodrome fell heavily to the ground. He was badly injured, but no bones were broken.

In July last Delagrangé was decorated with the Order of the Legion of Honor, and last month the Academy of Sciences, at Paris, voted him an honor medal for aeronautic achievement. In 1907 Delagrangé was elected president of the Aviation Club of France.

The name of Delagrangé is the fourth to be added to the roll of those killed in an accident while flying monoplanes. The fatalities have occurred while flying monoplanes, beginning with the death of Louis Blériot at Pau, France, in September, 1906. A year later, M. Lefebvre, a French aviator, was killed when his monoplane, a biplane, was killed when



Dirigible Balloon at Air Show.

BEATS AIRSHIP SPEED RECORD

Delagrangé Flies 124 Miles at Rate of
49 Miles an Hour.

JURVEY, Dec. 20.—At the aerodrome here to-day, in the presence of the official timkeeper of the Aero Club of France, Leon Delagrangé, in a biplane cross-country type monoplane, beat all records for speed and established a new monoplane record. Delagrangé covered 124 miles in 25 minutes, making an average speed of 49 miles an hour.

The weather was most almost hurricane, and the flight was accomplished without incident. The record gives the aviator an aviation on the territory of the brilliant feat.

Delagrangé intends to try for the Michelin Cup tomorrow.

PARIS, Dec. 20.—The crash French to show the 1000 records for distance and speed before Bordeaux. Latham and Farman tried at Pau in the Grand Prix, the latter practicing with a monoplane, with a view to making an attempt tomorrow for the Michelin Cup.

Latham and Farman are to make a test try to beat Farman's record for the Michelin Cup, which stands at 275 kilometers in 10 minutes in a biplane. Farman, however, is in readiness to defend his title of conqueror.

Comte Jacques de Lescaze, one of the best known Frenchmen on France, made to win the 1000-kilometer (621-mile) record covering fifteen kilometers in one mile.

000919

PARIS SLOWLY EMERGING FROM FLOOD

Efforts of Authorities Concentrated on Restoration of the Crippled Public Services, and Cleansing and Disinfecting City—Flooders Shot or Hanged to Lamp-posts.

PARIS, January 31.—From models until noon today the subsidence of the River Seine averaged only about a third of an inch so high. The water, however, continued to recede, with a slight increase. The temperature was slightly lower. The receding of the waters in some of the basins was noticeable during the afternoon. The total fall of the river up to noon was two feet. It is predicted that there will be a further fall of water between the Seine by noon to-morrow. The horse has dropped three feet from its level at Châteaufort, and the Seine has receded equally at Montreuil. The Seine remains stationary at Paris. The French Government estimates that it will be two weeks before the Seine has returned to normal level.

The situation at critical points was considered a considerable cause for anxiety. In the neighborhood of the St. Lazare station, the engineers now hope to be able within a few days to shore up the underground waterways and so prevent the collapse of streets and buildings, which has appeared imminent for several days. Armed detachments of the military will be held in the inundated districts while and outside the city until normal conditions are restored, is expected.

PARISIAN MORTUARYS TO LEAVE PORTS. Existing revenue claims are critical on the situation at the city's port. In several instances, "mortuaries" were found by their pursuers, and three were shot dead. Two others were hanged from lamp posts as examples of the fate in store for those detected in acts of pillage and violence.

The cutting of public services continues in the suburbs. Yesterday the image of St. Genevieve, patron saint of Paris, was carried by a solemn procession of Catholics through the afflicted districts to the left bank of the Seine.

Beginning this morning the authorities accelerated their efforts on the restoration of the crippled public services. The repair of telegraph, cable, and telephone lines, and the re-establishment of the damaged, rail railroad communication. There is no prospect of restoring the electric light and power system this week. Preparations are complete for cleansing and disinfecting the city. President Hesse of labor unions, in conference with other experts, has decided upon a series of measures which will be carried out by the sanitary officials. The principal danger to health is from the polluted water supply. The health authorities have now commenced a house-to-house campaign to be made, warning the occupants against consuming water which has been used until the same has been disinfected, and giving instructions that water must be boiled before being used. As the houses of mud built by the waters are removed from the houses, outbreaks will be absolutely ended and the flies and mites spread and whitewashed or painted.

Dr. Dubois, dean of the medical faculty of the University of Medicine, was communally afflicted today. He says that the malarial chills which enter the blood through the recirculation of the blood. The principal danger is from typhoid, the disease of which water is the most common cause of the disease.

STRENGTH OF AMERICA AND FINANCIAL CRISIS. The strength of America and financial crisis. The strength of America and financial crisis. The strength of America and financial crisis.

RAYMOND, SON OF THE FLOOD. RAYMOND, SON OF THE FLOOD. RAYMOND, SON OF THE FLOOD. RAYMOND, SON OF THE FLOOD. RAYMOND, SON OF THE FLOOD.

WATERBURY, JANUARY 31.—About 2000 men reached the offices of the National Red Cross today for the first time since the disaster. The waterburies were in the hands of the Red Cross. The waterburies were in the hands of the Red Cross. The waterburies were in the hands of the Red Cross.

SEINE FALLING RAPIDLY.

Paris Beginning to Look Normal.

Think City Will Escape Fever.

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ENGINEERS BLAMED FOR PARIS FLOODS

Mason Says Restoration Will Be Merely Stupendous Opportunity for Craft.

SPRING STUDIES DELAYED

Failure of Electric Lights Sets Back Work of Famous Dreamsmen—City Resuming Its Gayety.

Seize Case to Test New Town Zone.

PARIS, Feb. 1.—The onslaught of frost and snow which is which the engineering profession is now subjected in France on the theory that its members are responsible for the invasion of Paris by the floods is bitter in the extreme. Fictitious claims of the French and only asks who are more inferior, the Parliamentarians or the engineers, and not infrequently declares that the latter are.

He says that the presumptuous and arrogant confidence of the engineers in their dry formations prevents them from seeing the fact of which the water engineers would take explanation, such as the fact that the engineers were not open on the river only a few feet above the level of the sea.

He predicts that the city is in a dire and covered the engineers who should not plan for its restoration, the other factors of which will be lost they will surely offer another stupendous opportunity for political jobs.

Charles Benoit, president of the Paris in the victims of the present situation of the engineers. The dry of formal history, in fact, has done the harm. These engineers, in their technical sense, commanded orders, and did things, to power at a certain point, but they were not to power, improved much faster and much more the conditions of the city.

More Disasters Than Hopes. I find that my estimate that the material damage caused by the invasion of Paris by the Germans and the Communists in 1914 has been overestimated by the engineers of the city.

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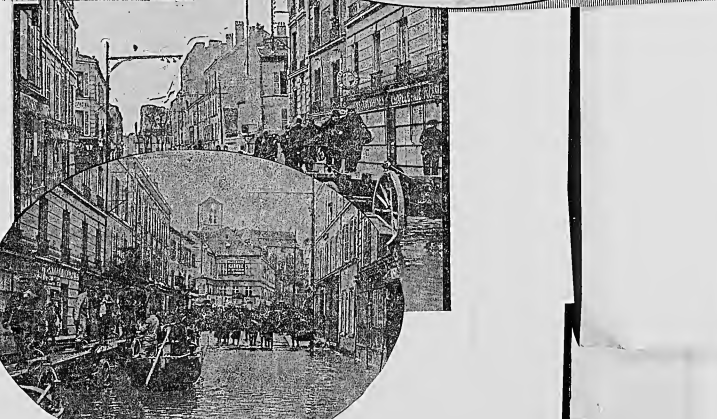
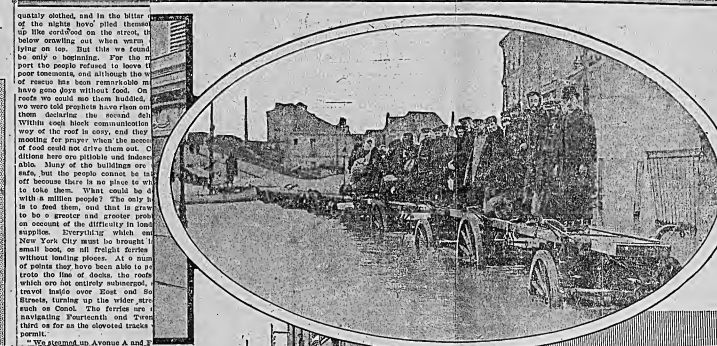
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THAMES, SUNDAY, FEBRUARY 6, 1910.

NEW YORK NG THE RISING OF THE FLOOD

Than

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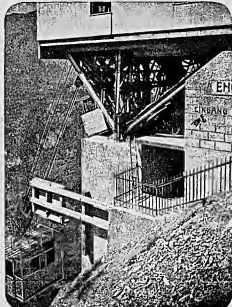
THE NEW AERIAL RAILWAY UP THE



A Car En Route Up the Face of the Wetterhorn, Grunewald Valley, Upper Bernois, Switzerland.



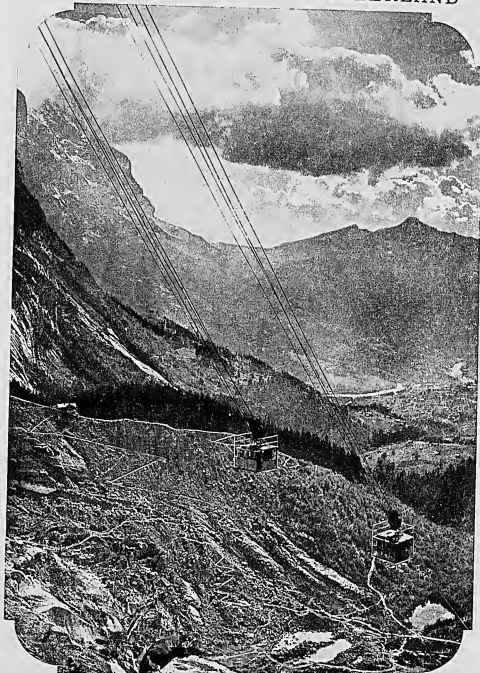
The Station, Grunewald, 2,200 Meters, in Height on the Wetterhorn, the Grunewald in the distance.



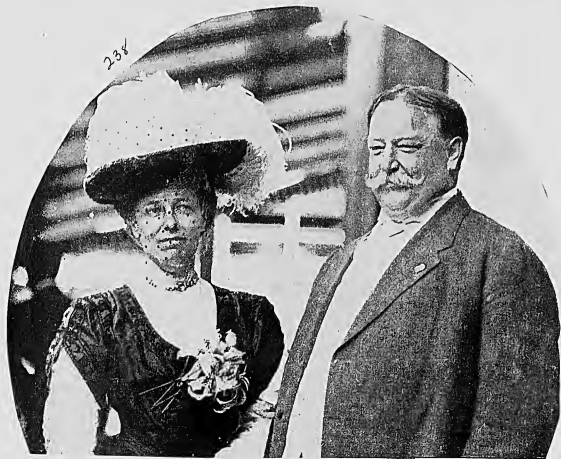
A Car Arriving at the Upper Station.

Sunday, March 6, 1910.

WETTERHORN, IN SWITZERLAND



Two Cars on Their Way—One Rises the Other Descends.
(Photo, Paul Thompson.)

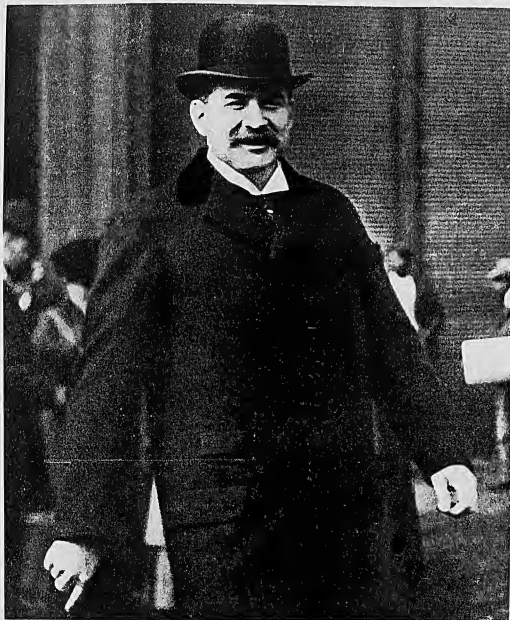


Sir Ernest Shackleton, the Explorer, Lady Shackleton and Her Sister, Who
N.Y. Times - March 6 Will Arrive in New York Early This Month.

240
Photographs of President Taft
 o His Inauguration and During His Recent Visit in New York.



Leaving the New York Home of His
N.Y. Times - March 6 Brother, Henry W. Taft. March 6, 1910

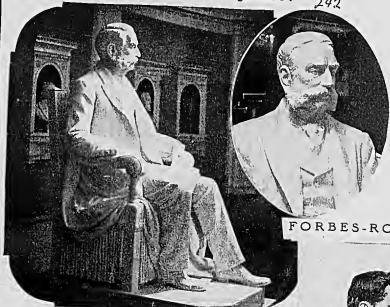


J. PIERPONT MORGAN, JR. *N.Y. Times Mirror 1910*
Taken a Few Days Ago on the Occasion of the Departure of J. Pierpont Morgan for Europe.
(When, Supposedly, by Axel Zorn)

241

STATUE OF MORRIS K. JESUP.

242



FORBES-ROBERTSON

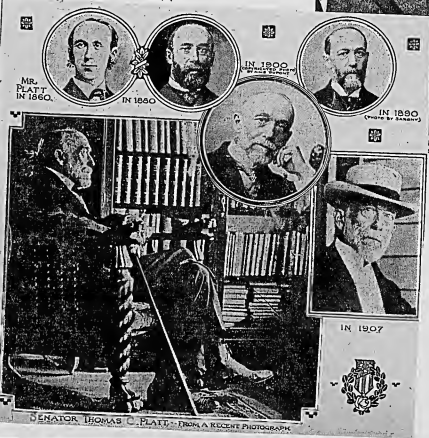
243

Recently Placed in the Museum of Natural History.



the Maxine

244



SENATOR THOMAS C. PLATT FROM A RECENT PHOTOGRAPH.

EDISON'S BATTERY READY.

The Inventor Says It Will Try It at Last on a Street Car.

WEST ORANGE, N. J., Jan. 15.—Thomas A. Edison said today that he had everything ready for a test on a street car battery. He has a car of his own for use in the city, and he has a car for use in the city. He has a car for use in the city, and he has a car for use in the city. He has a car for use in the city, and he has a car for use in the city.

The chief object of to-morrow's test is to determine how the car will work in the city. The car will be run on the city streets, and the battery will be used to power the car. The car will be run on the city streets, and the battery will be used to power the car. The car will be run on the city streets, and the battery will be used to power the car.

244

249
N.Y. Times - Feb. 12, 1910
TIMES, SATURDAY.

TEST EDISON CAR ON CROSSTOWN LINE

Inventor Assests His Storage Batteries Will Soon Supply Plant Trolley Equipment.

ALL DEPENDS ON THE COST

Car Used Yesterday Seemed Satisfactory So Far as Its Mechanical Features Were Concerned.

The long-promised trip of the Edison car, the car seemed to have little to be said for it. It was not a very good car, and it was not a very good car. It was not a very good car, and it was not a very good car. It was not a very good car, and it was not a very good car.

249

NEW STORAGE CAR RUNS A FULL DAY

Edison Canned-Current Model Makes 65 Miles in Crowded Streets Without a Hitch.

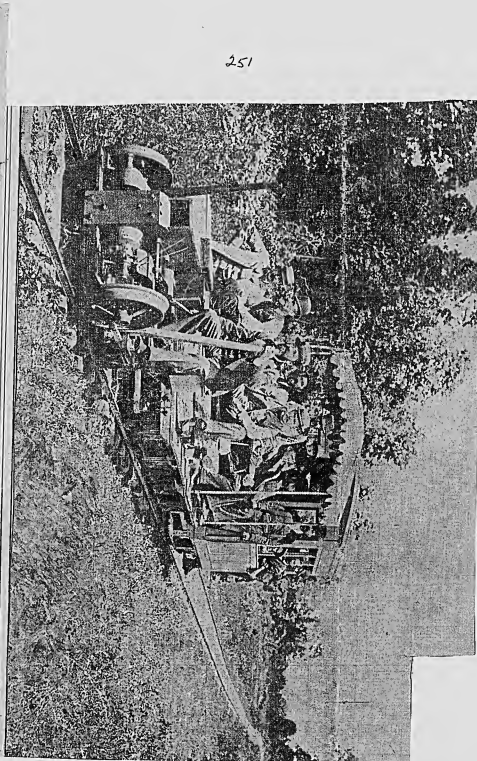
NOW IN REGULAR SERVICE

Cost of Operation Estimated to be Less Than a Fifth of That of a Trolley Car.

The new Edison storage battery street car made its way into the horse barn of the Twenty-ninth and Twenty-sixth Street Railroad test track, as a regular fare collecting vehicle of the streetcar after a day's service. The idea of the actual service in carrying cross-town passengers is, was carried forward, where a track was laid a hole through a window, and after the car had been run, it was found that it was not a very good car, and it was not a very good car.

249

EDISON'S FIRST ELECTRIC TROLLEY CAR AT NEW YORK PARK, N. Y.



"But didn't you say of service to the Edison car?" asked a reporter. "Yes," said Edison. "I have a car of my own, and I have a car of my own. I have a car of my own, and I have a car of my own. I have a car of my own, and I have a car of my own. I have a car of my own, and I have a car of my own."

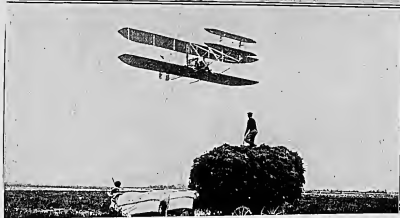
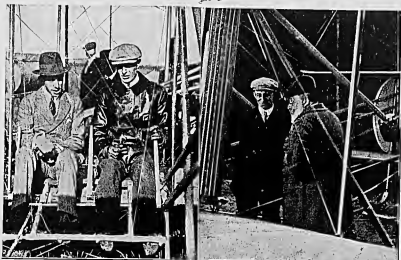
The car was not a very good car, and it was not a very good car. It was not a very good car, and it was not a very good car. It was not a very good car, and it was not a very good car. It was not a very good car, and it was not a very good car.

Mr. French told the Edison storage battery was not a very good car, and it was not a very good car. It was not a very good car, and it was not a very good car. It was not a very good car, and it was not a very good car. It was not a very good car, and it was not a very good car.

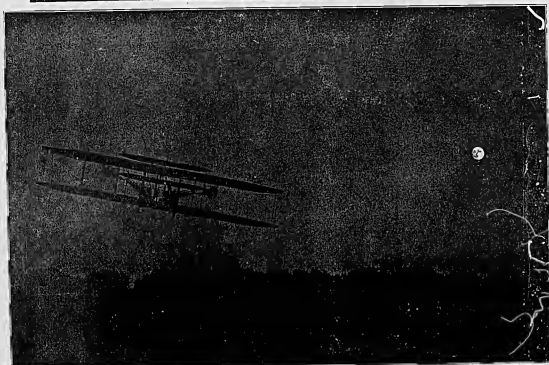
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A NIGHT FLIGHT OF THE WRIGHT AEROPLANE

[This photograph was made at 5.10 P.M., September 21st, just before Mr. Orville Wright descended from a flight. It was dark and the moon had risen. Mr. A. Haskelly Engerer was making pictures for 'The World's Work' and to avoid carrying heavy camera equipment he took a chance and pointed his camera at the sky. These lanterns were required to develop the picture. The lanterns and men on the land were not, and hence possible the remarkable photograph. Note the delicate structure of the shadow on the moon.—THE ENRANGER.]



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M. BLERIOT FLYING LOW OVER LAND

MR. ORVILLE WRIGHT AND
LEARN OF THE NEW MR. WRIGHT



M. LOUIS BLERIOT

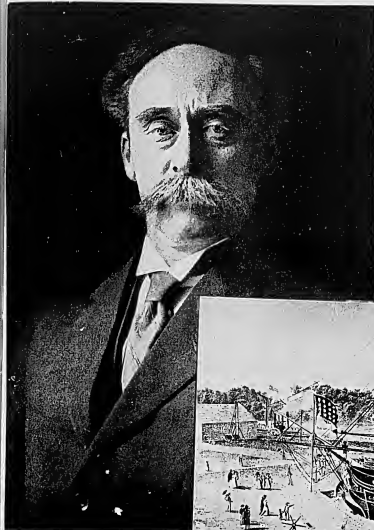
THE FIRST AERIAL NAVIGATOR TO CROSS THE ENGLISH CHANNEL IN AN AEROPLANE



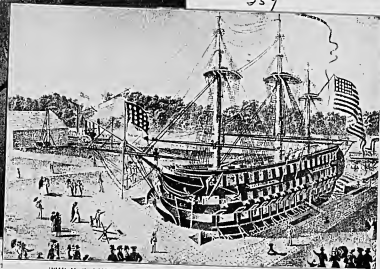
Copyright by Smithsonian Institution
PEARY ON THE DECK OF THE ROOSEVELT.



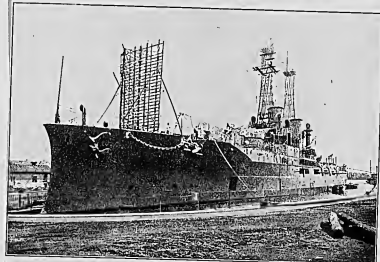
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COMMANDER ROBERT E. PEARY
WHO REPORTED ON SEPTEMBER 6th, THAT HE REACHED THE NORTH POLE
ON APRIL 6, 1909, AFTER TWENTY-THREE YEARS OF ARCTIC EXPLORATION



A NEW PHOTOGRAPH OF
WHO HAS ALREADY RECEIVED A GOLD MEDAL FROM
THE U. S. LINE-OF-BATTLE SHIP "DELAWARE," LAUNCHED IN 1860



THE U. S. LINE-OF-BATTLE SHIP "DELAWARE," LAUNCHED IN 1860



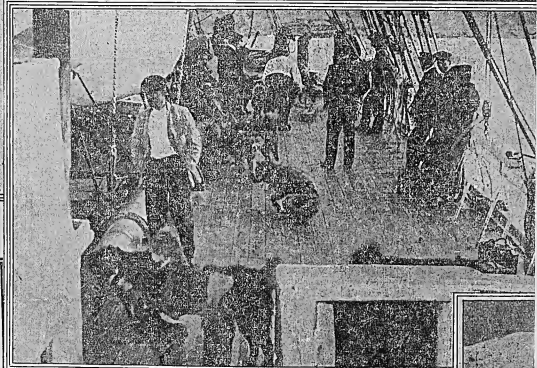
THE PRESENT U. S. S. "DELAWARE" IN THE SAME DOCK, 1910
Photograph by H. C. M. Co., New York

CAMPING ALONG THE

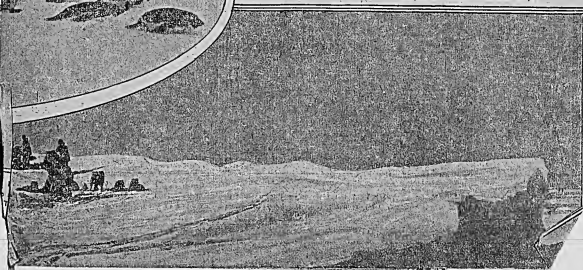
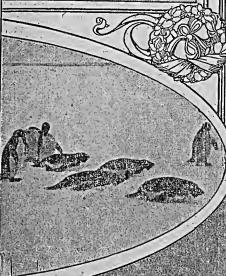
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ON THE ROAD—SHOWING HOW SLEDGES WERE PACKED. (C)



THE DECK OF THE FRAM. (C)

THE POLAR PARTY KILLING AND SKINNING SEALS.
Seal Meat Was One of the Main Staples of Food on the Polar Trip.

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Picture Section,
Part 1

The New York Times

263
Sunday,
May 17, 1914

THE NATION'S HONORS FOR HER FIRST DEAD FROM MEXICO



PRESIDENT WILSON (X) DELIVERING THE FUNERAL ADDRESS AT THE BROOKLYN NAVY YARD OVER THE BODIES OF THE UNITED STATES SAILORS AND MARINES WHO WERE KILLED IN THE CAPTURE OF VERA CRUZ

NO THE
a Brown Bros.)

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The New York Times

SORROWING THROG AT CITY



THE FUNERAL PROCESSION OF THOSE WHO WERE SLAIN IN MEXICO LEAVING CITY HALL THROUGH LINES OF SILENT, UNCOVERED MASSES OF CITIZENS, HEREIN IN CORDON. Mayor Mitchell, awaiting the Procession on the steps of the City Hall, Lieut. Kennel, bears the Wreath Given by the City.

(Photo (C) by International News Service and Photo by John Leitch.)

Americans and Mexicans Equally
Eager to Leave Scene of Conflict

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DENSE CROWDS ON BROADWAY WHILE THE SEVENTEEN CAISSONS BEARING THE BODIES PROCEED FROM THE BATTERY TO THE CITY HALL. St. Paul's Chapel is Seen on the Right of the Picture.

(Photo by Brown Bros.)

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President
Wilson and
Mayor Mitchell in the
Procession



Left: HATH THOMAS CORBIE, ARCTIC HUNTER.
Right: FRANCIS HUNTER, RETURNING FROM AN HUNT AT WILLAG SOOTH.



THE FUNERAL PROCESSION CROSSING MANHATTAN BRIDGE
TO THE BROOKLYN NAVY YARD
(Photo (C) by American Press Ass'n.)

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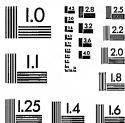
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